

www.water.imdea.org

annual report
2024



Irene de Bustamante Gutiérrez

Director, IMDEA Water Institute

words from the director...

I am pleased to present to society this annual report of IMDEA Water's activities.

In 2024, IMDEA Water has achieved several important milestones: we have renewed the international EFQM 400 certification for Excellent, Innovative and Sustainable Management; a working team was established to develop the Scientific Strategy for the coming years; and our staff has grown by more than 20%, driven in part by the incorporation of a researcher awarded an ERC Consolidator Grant, which has significantly contributed to strengthen one of the institute's strategic lines.

Our research staff has developed numerous projects and contracts in collaboration with more than 40 countries. Noteworthy results include new collaborations, high-quality scientific publications (75% in Q1), integration into new working groups within strategic international water-sector platforms, participation in expert panels, roundtables, scientific committees, outreach events and giving lectures. Additionally, 8 doctoral theses were defended.

Our laboratories continue to develop new analytical methodologies in the field of mass spectrometry for the extraction and analysis of micro and nanoplastics and the identification of associated additives. We continue to work on metagenomic sequencing for the detection of antibiotic resistant genes in environmental matrices, as well as on the identification of cyanotoxins. Furthermore, we obtained a grant for acquiring new equipment for the mass spectrometry unit which will significantly enhance our analytical capabilities.

And I cannot fail to thank all the people who work at IMDEA Water for their commitment to increasing the relevance of our institute day by day: our researchers, for their work in formulating new ideas, obtaining funding and training new generations of scientists; our predoctoral research staff for their enthusiasm for science and research; our technical staff, whose dedication and expertise make the execution of projects possible; and all the administration and management staff, who ensure the smooth running of the institution. Without all these people we could not generate knowledge, be a benchmark in scientific and technical production or contribute to the water sustainability of the planet.

palabras de la directora...

Tengo la satisfacción de presentar a la sociedad, esta memoria anual de actividades del instituto IMDEA Agua.

En 2024 se han alcanzado varios hitos importantes en IMDEA Agua: hemos renovado la certificación internacional del sello EFQM 400 a la Gestión Excelente, Innovadora y Sostenible; se estructuró el equipo de trabajo para elaborar la Estrategia Científica para los próximos años; y hemos aumentado en más del 20% la plantilla gracias, en parte, a la incorporación de un investigador con una subvención ERC Consolidator Grant, que ha contribuido a reforzar notablemente una de las líneas estratégicas del instituto.

Nuestro personal investigador ha desarrollado numerosos proyectos y contratos en colaboración con más de 40 países, destacando entre los resultados, nuevas colaboraciones, artículos científicos de alta calidad (el 75% en Q1), incorporación a nuevos grupos de trabajo en plataformas internacionales estratégicas en el sector del agua, ha participado en paneles de expertos, mesas redondas, comités científicos,

eventos de divulgación, impartiendo conferencias, y también se han defendido 8 tesis doctorales.

Nuestros laboratorios siguen desarrollando nuevas metodologías analíticas en la línea de espectrometría de masas para la extracción y análisis de micro y nanoplasticos e identificación de aditivos asociados, se sigue trabajado en la secuenciación metagenómica para la detección de genes resistentes a los antibióticos en matrices ambientales, así como en la identificación de cianotoxinas, y también se ha conseguido una subvención para la adquisición de nuevo equipamiento para la unidad de espectrometría de masas que permitirá una mejora importante de nuestras prestaciones analíticas.

Y no puedo dejar de agradecer a todas las personas que trabajan en IMDEA Agua, su compromiso para incrementar día a día la relevancia de nuestro instituto: a nuestro personal investigador doctor, por su labor en la formulación de nuevas ideas, consecución de fondos y formación de nuevas generaciones investigadoras; al personal investigador predoctoral por su entusiasmo por la ciencia y la investigación; a nuestro personal técnico, que con su dedicación y saber hacer, hace posible que los proyectos se desarrollen; y a todo el personal de administración y gestión, que garantiza el buen funcionamiento de la institución. Sin todas estas personas no podríamos generar conocimiento, ser un referente de producción científica y técnica y contribuir a la sostenibilidad hídrica del planeta.



a n n u a l r e p o r t

2024

w w w . w a t e r . i m d e a . o r g

editor

IMDEA Water Institute

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executive summary

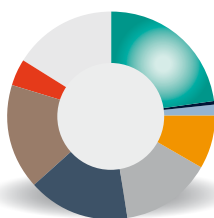
Human Capital



- 55 Researches
- 19 Laboratory staff
- 9 Associated researchers
- 10 Administration and management staff



Scientific results



- 42 Articles in journals, 31 in high impact journals (Q1)
- 2 Books
- 3 Books chapters
- 15 Lectures
- 26 Round tables and experts panels
- 29 Participation in Scientific Committees
- 30 Conferences
- 8 PhD thesis defended
- 29 PhD thesis in progress

Origin of funds



- 36% from projects & contracts
- 9 Active international projects
- 14 National and regional projects
- 12 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

Geomatic Laboratory

Hardware, software
and databases

High-level up-to-date specialized analysis and testing laboratory

Chemical, biological and soil analysis



overview

[Purpose, mission and vision - IMDEA Water](#)

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



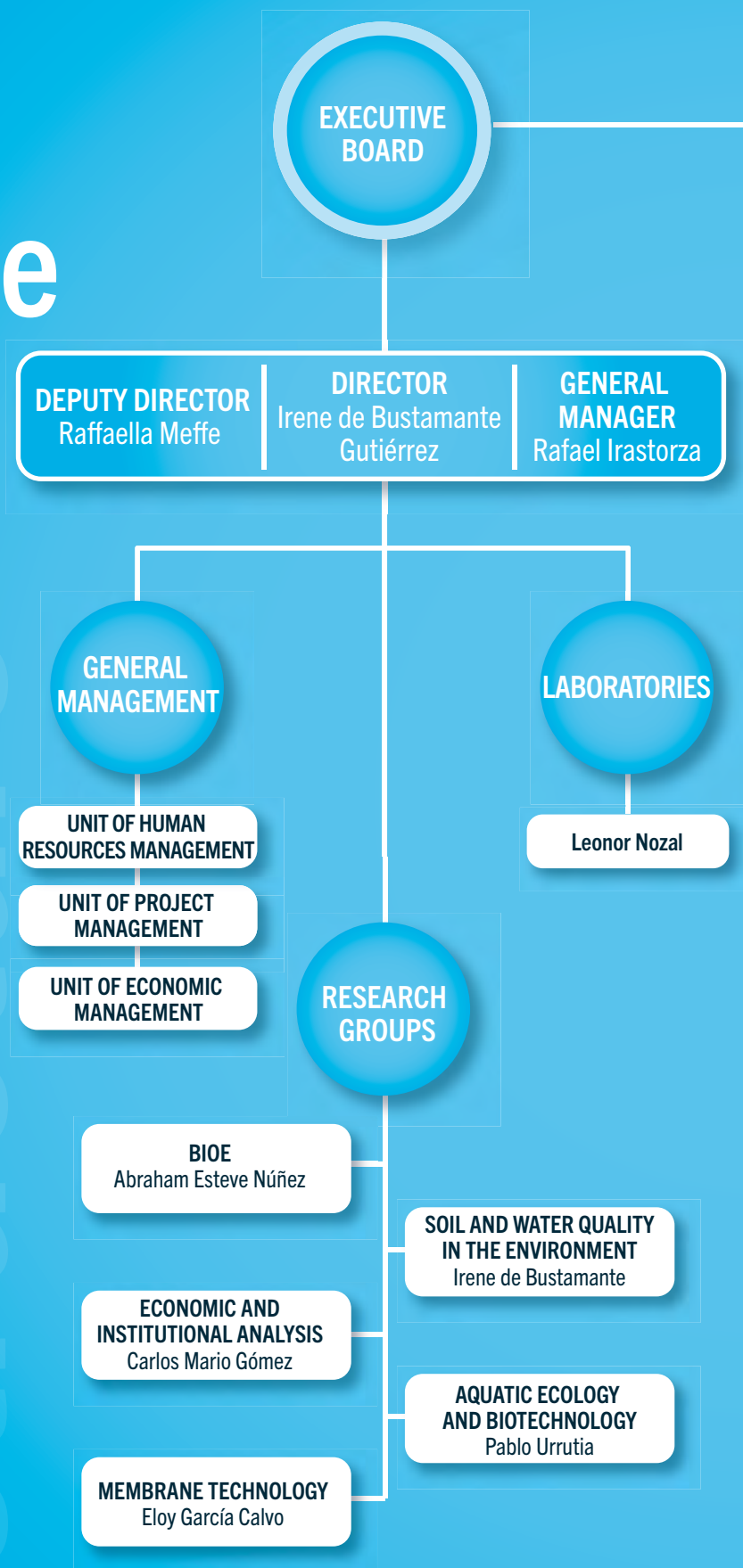
Aquatic ecology
and biotechnology

SUSTAINABLE DEVELOPMENT GOALS

[SGD - IMDEA Water](#)



our structure



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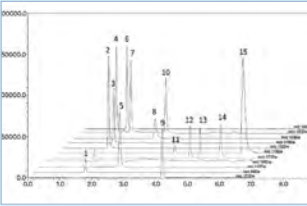
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AQUALIA. INTEGRAL WATER MANAGEMENT

infrastructures and sc

Analysis and Testing Lab

Chemical Analysis Service			
Basic Analysis Unit	Chromatography Unit	ICP-MS Unit	Mass Spectrometry Unit
 Determination of several physical and chemical parameters (pH, conductivity, redox potential, TKN, alkalinity, TOC, DBO₅, DQO...) laid down in the regulations on control of water quality and dumping. 	 Determination of organic compounds, anions and cations in water samples by the separation principles of chromatography (HPLC and ionic chromatography). 	 Analysis of trace levels of metals, metalloids and other major elements present in different matrices (water, soil, biota, etc.) by inductively coupled plasma mass spectrometry equipment, with optional coupling with HPLC for speciation studies. 	 Identification and quantification of organic compounds (pesticides, pharmaceuticals, BTEX, trihalomethanes...) at trace levels with chromatography systems (liquid and gas chromatography) coupled to mass spectrometry with different kind of mass analyzers (high sensitivity and high resolution). 

pilot plants

Membrane Technology

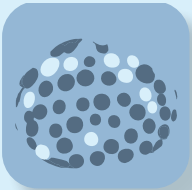
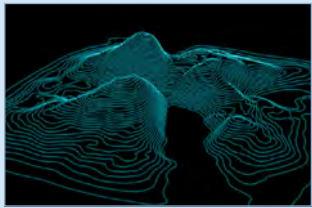


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Scientific equipment

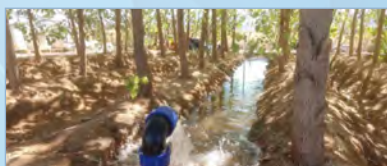
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Laboratory			Geomatic Laboratory
	Biological Analysis Service	Soil Analysis Service	 Provides technology-based solutions. Fully equipped with hardware, software, and databases for modelling; development of specific maps using remote sensing techniques, GPS, and conventional documentary sources; automation of data collection; and application of simulation models.
Micronanoplastic Unit	Microbial Ecology Unit		
 Analysis of micro and nanoplastic particles (MNPs) in environmental samples (water, soil, sediment). Identification of the polymer type, physical characterization (shape, size...) and semi-quantification. 	 Analysis of biological and microbiological indicators. DNA and RNA sequencing for bacterial biodiversity studies and metagenomics. Determination of minimum inhibitory concentrations of microorganisms. Detection and quantification of SARS-CoV-2 in wastewater. Monitoring of cyanobacteria blooms and their toxins. 	 Determination of physicochemical properties of soils, sediments, and similar solid matrices (texture, moisture, pH, electrical conductivity, organic matter, total nitrogen...). 	

Microbial Electrochemical Technologies



Land Application Systems



Outdoor Mesocosm Facilities



Chemical Analysis Service

Basic Analysis Unit



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

Equipment

- Total Organic Carbon (TOC) Analyzer. TOC-V CSH model.
- Automatic titration, 809 Titrando (Methrom).
- Photometer Spectroquant Prove 100 (Merck).
- Photometer DR 3900 (Hatch).
- UV-1800 model from Shimadzu.
- Particle counter for water samples (0.2 and 2 microns). LS_200 model from Particle Measuring System Inc.

- Turbidimeter
- Colorimeter
- Muffle oven

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 Service

Chromatography Unit

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Liquid Chromatography coupled to Ultraviolet/ refractive index detector (HPLC-UV/IR)

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 coupled to UV/IR detectors (Agilent Technologies).

Applications

- The field of application for this technique is very wide ranging. Some of the applications are listed here:
- Determination of bronopol in water samples.
- Succinic, lactic, fumaric, acetic acids in water.

Ion Chromatography

Ion Chromatography is a variant of High Performance Liquid Chromatography (HPLC). Separation and determination of ions is 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. It allows simultaneous determination of anions and cations with conductivity detector.

Applications

- 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 Service

ICP-MS Unit



ICP-MS is the analytical technique with the greatest potential for determination of trace level pf metals and metalloids in all types of matrices. This technique is very selective, sensitive and requires few milliliters of sample. In the case of solid samples, is necessary to perform an acid digestion prior to analysis.

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 (helium gas mode) for achieving a greater sensitivity, less background noise and a high removal of spectral interferences. Option of coupling separation techniques such as high performance liquid chromatography (HPLC) for speciation studies, and a microwave digester ETHOS One (Milestone) for pretreatment of solid samples.

Applications

- Multielemental semi-quantitative analysis. Determination of major and minor elements present in a sample in one run.
- Quantitative analysis of elements from ng/L to mg/L levels. Linear dynamic range of 8 orders of magnitude and low detection limits (ng/L (ppt)) for most of elements.
- Low volumes of sample (<600 μ L)
- Analysis of biological, organic and inorganic samples by closed acid digestion using a microwave system.
- Environmental applications (water, soils, sediments and other residues).
- Study of oxidation state and bioavailability (speciation) of metals and metalloids in complex matrices.

Chemical Analysis Service

Mass Spectrometry Unit

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Mass Spectrometry (MS) is a highly sensitive instrumental analytical technique able to qualitatively and quantitatively assess all types of mixtures of substances. The ions are separated according to their mass/charge (m/z) ratio and detected. This technique provides information of molecular fragments, which allows to determine the molecular mass of compound as well as elucidate their chemical structures.

Equipment

- 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) coupled to Triple TOF 5600 model (AB sciex). Liquid Chromatography coupled to TOF analyzer (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).

Applications

- Determination of monoisotopic mass and fragmentation studies.
- Identification of organic compounds by comparison of experimental spectral information with GC-MS and LC-HRMS libraries and databases.
- Analysis of organic micropollutants in waters by GC-MS/MS (organochlorine and organophosphorus pesticides, trihalomethanes, polyaromatic hydrocarbons).
- Multi-residue quantification LC-MS/MS methods for monitorization of organic micropollutants in water, soil and biota samples at ng/L and ng/g levels.
- Development of analytical methodologies to support research projects about new environmental concerning issues, and to answer the new requirements in current legislation regarding water quality.

Chemical Analysis Service Micronanoplastics Unit



This is a unit specialized in the analysis of MNPs in environmental samples, provided by specific instrumentation, as pyrolysis and infrared microscopy for the identification, characterization and semi-quantification of the micro and nano particles

Pyrolysis coupled to GC-MS is the most common technique used for the quantification of MNPs in a diversity of samples. During the pyrolysis process, the fragmentation of the plastic polymers occurs due to the high temperatures applied, and specific fragments are separated and detected in the GC-MS. Thus, identification and quantification of different types of polymers as polyethylene, polystyrene, polypropylene, PET, PVC... that are present in the samples is possible.

Infrared microscopy techniques allows the MNP particles location (10 μm or lower sizes), the count, identification and size and type distribution. Information obtained from this analysis is complementary to the one obtained by Py-GC-MS.

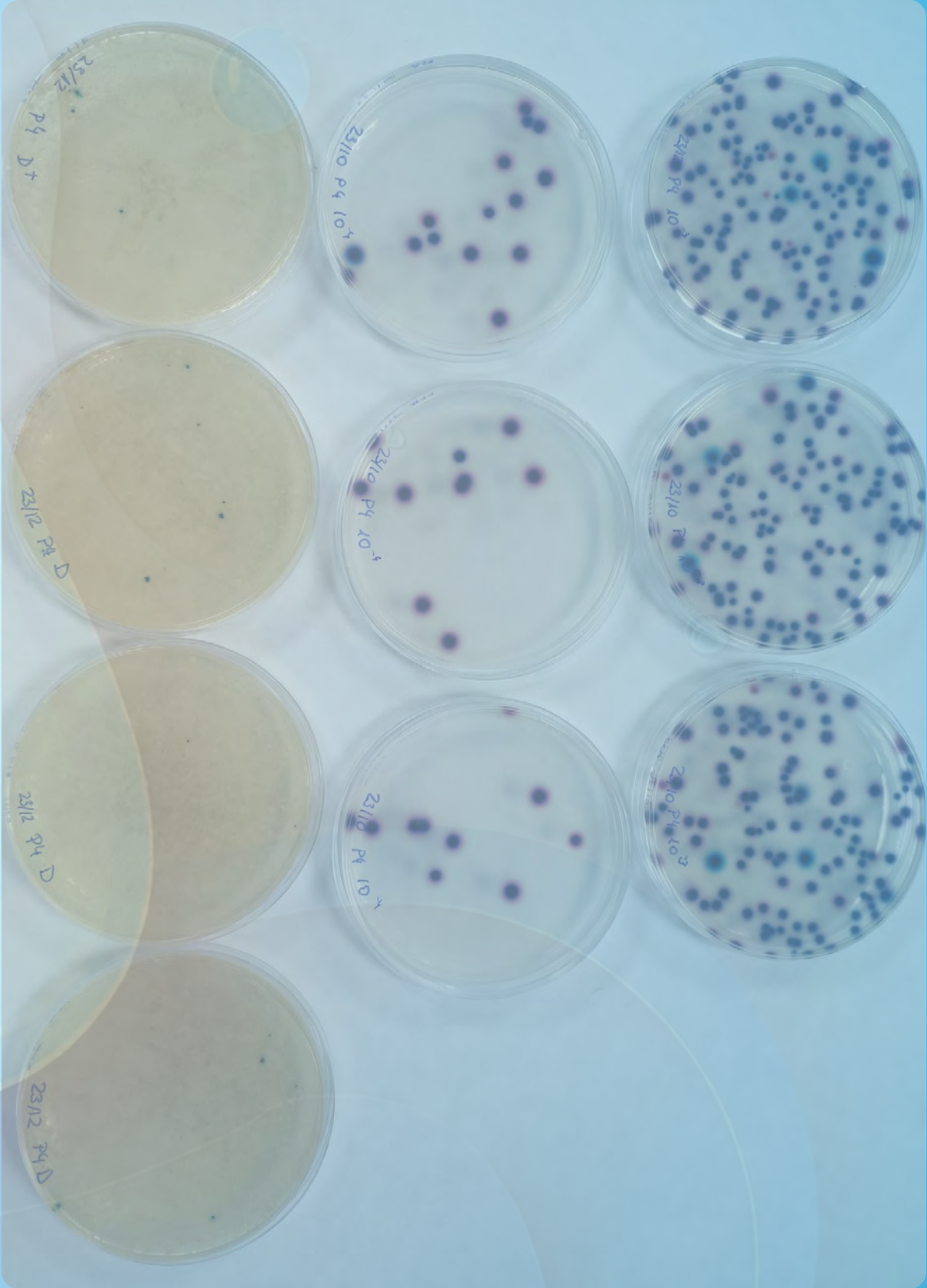
For particle separation the use of a field-flow fractionation system is an option. With this system the separation of MNP particles from 10 nm to 20 μm is possible, thus different fractions of a sample with different particle sizes can be recovered. Then these fractions can be analyzed by Py-GC-MS or μFTIR -Raman, so complementary information about size distribution, molecular weight and surface charge can be obtained.

Equipment

- 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 Technologies).
- Infrared microscopy chemical imaging system (μFTIR -Raman), IRT-5000, FT/IR-6X, NRS-4500, from JASCO.
- Field-flow fractionation system coupled to ultraviolet/refraction index detector and multiangle light scattering (FFF-UV/IR-DLS), model CF 2000 from POSTNOVA.

Applications

- Identification and semi-quantification of 5 polymers (polystyrene, polypropylene, polyethylene, PET and PVC) in water samples (waste, surface and underground water) by Py-GC-MS.
- Identification, characterization and count of microplastic particles by μFTIR in water samples, soil and sediments.
- Screening of polymers in water samples by Py-GC-MS.
- Development of analytical methodologies for the determination of MNPs in other kind of samples like sludge by Py-GC-MS, by optimizing strategies for sample treatment (digestion and cleanup) and preconcentration steps.



Soil Analysis Service



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 characterization 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 utilized, 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 analyze 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 aluminum.
- 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 m², 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.

Action funded through the agreement between the Community of Madrid (Regional Board of Education, Universities, Science and Spokesperson's Office) and the IMDEA Water Foundation for the direct granting of a grant of 1,135,000.00 euros to finance the performance of actions in the field of research on SARS-CoV-2 and the COVID-19 disease financed with REACT-EU resources from the European Regional Development Fund.

Biological Analysis Service Microbial Ecology Unit



The Microbial Ecology Unit provides a comprehensive microbiological analysis service, encompassing both classical and molecular methods, aimed at assessing the quality of surface waters, groundwater, and related matrices. Our analyses are carried out according to national and international standardized methods, complying with the standards established in the UNE-EN ISO norms for microbiological water quality analysis.

Equipment

Molecular biology infrastructure

- MinION (Nanopore) MK1C and MK1 sequencers
- Real-time PCR LightCycler 96 (Roche) and AB7300 (Thermo)
- Nanodrop (Thermo) and Qubit4 fluorometer (Invitrogen)
- Gel documentation system GelDoc (Bio-rad)
- SimpliAmp and TC-5000 thermocyclers (Applied Biosystems)
- Homogenizer for DNA extraction (Precellys).

Microscopes to facilitate identification and counting microscopic organisms:

- Light microscope (Olympus)
- Stereo microscopes.
- Fluorescence inverted microscope (Nikon)

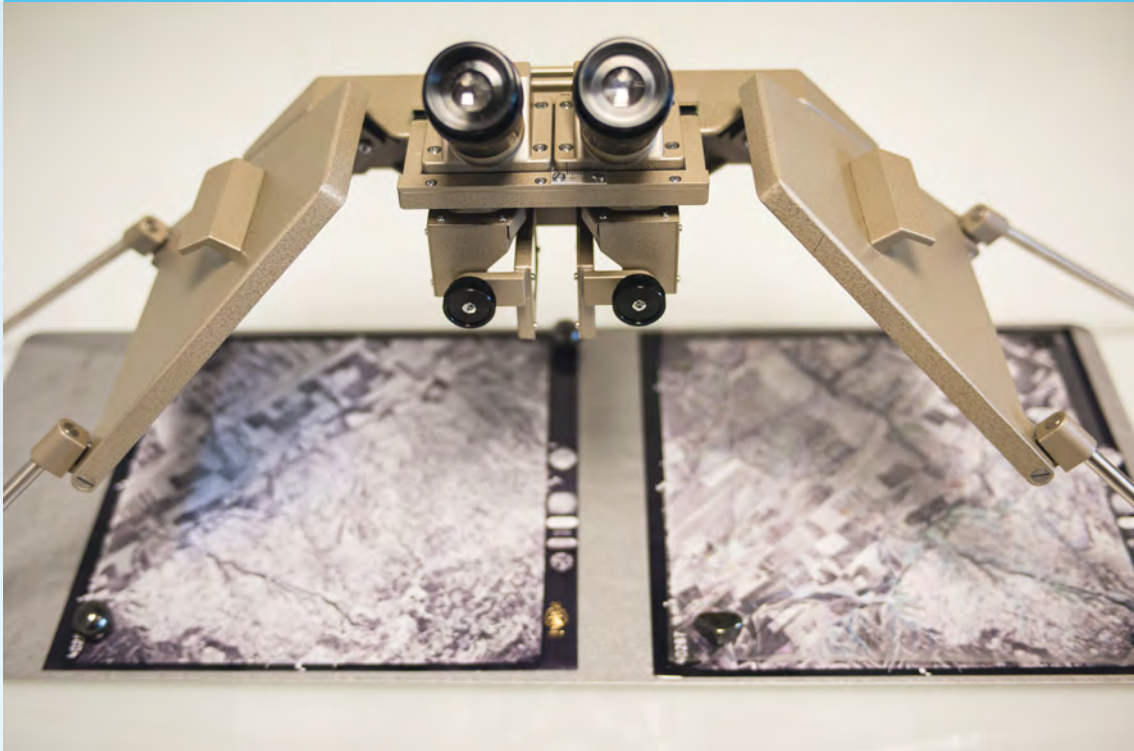
Infrastructure for the cultivation and analysis of micro-organism

- 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.
- Plate reader Multiskan FC (Thermo)

Applications

- DNA and RNA Extraction from different matrices
- DNA and RNA sequencing using nanopore technology for bacterial biodiversity studies and metagenomics.
- Detection and quantification of specific genes of environmental relevance, such as those related to the nitrogen cycle, antibiotic resistance, and microcystin production.
- Analysis of microbiological indicators (*E. coli*, *Enterococcus*, Coliforms, *Clostridium*, *Pseudomonas aeruginosa*) to determine the quality of drinking and recreational waters.
- Determination of Minimum Inhibitory Concentrations (MICs) of microorganisms (antibiograms).
- Enzymatic activity analysis for soil such as Phosphatase, Arylsulfatase, β -Galactosidase, Urease

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, CXT-FIT, 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:

- One pilot plant spiral wound ultrafiltration membrane equipment.
- Laboratory scale cross flow plants with different configurations (spiral wound, hollow fiber and flat sheet membranes).
- 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 chromatography
- Electrochemical instrumentation.
- Microbial electrochemical fluidized bed reactors (MEFBR) for wastewater treatment and to produce valuable products (bioelectrosynthesis).

Outdoor mesocosm facilities

- Artificial ponds: Twenty-four artificial ponds (1 m³) to investigate the impacts of environmental stressors on lentic systems, as well as to develop nature- and technology-based solutions to mitigate those impacts.
- Artificial channels: Nine artificial channels (5 m length, 30 cm wide) to conduct similar research in lotic ecosystems.
- Biodiversity lagoon: artificial lagoon (30 m³) for growing biological communities for their use in experiments

Land application systems

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

- Vegetation filters: two plots of 50 m² equipped with: flow meters, irrigation hydrants, impulse pumps, possibility of installing tanks 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



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1. Projects

1.1. Urban, Industrial and Agricultural Wastewater Treatment

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



[BEER4all - IMDEA Water](#)

Grant CPP2021-008852 funded by:



1.1.2. National Network of Microbial Electrochemical Technologies (IBERIMET)

[IBERIMET - IMDEA Water](#)

Grant RED2022-134954-T funded by:



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



[Mobimet - IMDEA Water](#)

Grant CPP2021-008936 funded by:



1.1.4. Transformation of energy intensive process industries through integration of energy, process, and feedstock flexibility (TRINEFLEX)



[Trineflex - IMDEA Water](#)

This project is funded by the European Union's HORIZON EUROPE research and innovation programme under grant agreement No 101058174.



1.1.5. Diffusion of innovative solutions & capacity building for smart irrigation (SMART GREEN WATER)

[SMART GREEN WATER - IMDEA Water](#)

Project S1/1.4/F0080 funded by Interreg Sudoe



1.2. Water Reuse

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

[Nat4Health - IMDEA Water](#)

Grant PID2020-118521RB-I00 funded by:



1.3. Economic and Institutional Analysis

1.3.1. Water Security for the planet (Water4All)

[Water4All - IMDEA Water](#)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 101060874.



1.3.2. Scientific network on the risks of extreme events and pollution on the Iberian fluvial systems: Application to management (AQUAIBER-NET)

[Aquaiber-Net - IMDEA Water](#)

Grant RED2022-134781-T funded by:



1.3.3. Nature-based Solutions for Resilient Adaptation to Water Scarcity and Hydroclimatic Extremes (NATURA)

[NATURA - IMDEA Water](#)

Grant CNS2022-135132 funded by:



1.3.4. Integrated decision support tool for reliable and affordable application of manage aquifer recharge with alternative water resources in river basin and drought management plans (MARCLAIMED)

[MARCLAIMED - IMDEA Water](#)



This project received funding from the European Union under the Horizon Europe Program, with grant agreement no. 101136799



1.3.5. Transformational and robust adaptation to water scarcity and climate change under deep uncertainty (TRASCEND)

[TRANSCEND](#)



This project is funded by the European Union's HORIZONTE EUROPE research and innovation program under grant agreement no. 101084110



1.3.6. Tackling Water Theft: Forecasting Adaptation Surprises (WATER THEFT)

[WaterTheft - IMDEA Water](#)

ERC Consolidator Grant. This Project is funded by the European Union's HORIZONTE EUROPE research and innovation program under grant agreement no. 101124884



1.3.7. Diálogo de Talanoa sobre el agua para una adaptación transformadora a la escasez de agua en el marco del cambio climático (TALANOA)

[TALANOA-WATER - IMDEA Water](#)



TALANOA-WATER is part of the PRIMA Programme supported by the European Union

The PRIMA programme is supported under Horizon 2020 the European Union's Framework Programme for Research and Innovation. Grant Agreement number: 2023



1.4. Membrane Technology

1.4.1. Plastisphere in urban wastewaters: Membrane based hybrid systems for water reuse and sludge recycling (EMERGING)

[EMERGING - IMDEA Water](#)

Grant PID2022-143233OB-I00 funded by:



1.5. Aquatic Ecology and biotechnology

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

[PERIAMAR - IMDEA Water](#)

Reference: CA18221. Funded by:



1.5.2. Toxic cyanobacterial blooms as a threat to pollination in a changing climate

[CYANOBACTERIAL - IMDEA Water](#)

Grant 2022-T1/AMB-24063 funded by:



1.5.3. Risk assessment and impact mitigation of tire wear particles and de-icing agents on river ecosystems from High Mountain National Parks

[REMOTE - IMDEA Water](#)



Project 3303/2024 has been supported by the Autonomous National Parks Agency.



1.5.4. Cyanotoxin-degrading bacterium as a nature-based solution to protect freshwaters threatened by harmful cyanobacterial blooms (CyANOTOX)

[CyaNOTox](#)



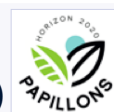
Grant PID2023-151413OA-I00 funded by:



1.6. Micro and Nanoplastics

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

[PAPILLONS - IMDEA Water](#)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000210.



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

[nanoCLEAN - IMDEA Water](#)

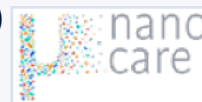
Grant PID2019-111519RA-I00 funded by:



1.6.3. Quantification of micronanoplastics in reclaimed water and agricultural ecosystems. Environmental risk assessment (μ NanoCare)

[μNanoCare - IMDEA Water](#)

Grant RTC2019-007261-5 funded by:



1.6.4. Plastic chemical additive release from plastic debris and their mobility in soil agroecosystems (ADDIPLAS)

[AddiPlaS - IMDEA Water](#)

Grant PID2022-140011OB-I00 funded by:



2. Contracts

2.1. Economic and Institutional Analysis

2.1.1. Multiple Framework service contract in four (4) lots for the provision of external expertise on regulatory and policy issues in the fields of: Lot 2: Climate Change.



2.1.2. Framework Contract on economic analysis of environmental policies and analytical support in the context of Better Regulation.



2.1.3. Framework contract for “Water for the Green Deal’ - Implementation and development of the EU water and marine policies”.



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



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



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



2.2. Wastewater Treatment

2.2.1. Research on hybrid storage technologies and predictive modeling for transforming industries into offshore renewable energy management points.

REGENERA - IMDEA Water



2.2.2. Testing and validation of wastewater reuse systems using bioelectrochemical technologies.

<https://water.imdea.org/bioe-contract/testing-and-validation-of-wastewater-reuse-systems-using-bioelectrochemical-technologies/>

Reference: 59/006970.9/22 Funded by: Community of Madrid and European Regional Development Fund (ERDF). Cheque Innovación



Comunidad
de Madrid



EUROPEAN UNION
European Regional Development Fund

3. Grant for Scientific and technical Equipment

3.1. Acquisition of scientific-Technical equipment for REDLAB Laboratories of the Community of Madrid

Grant 2024-REDLAB/TEC-33814 funded by:



Comunidad
de Madrid

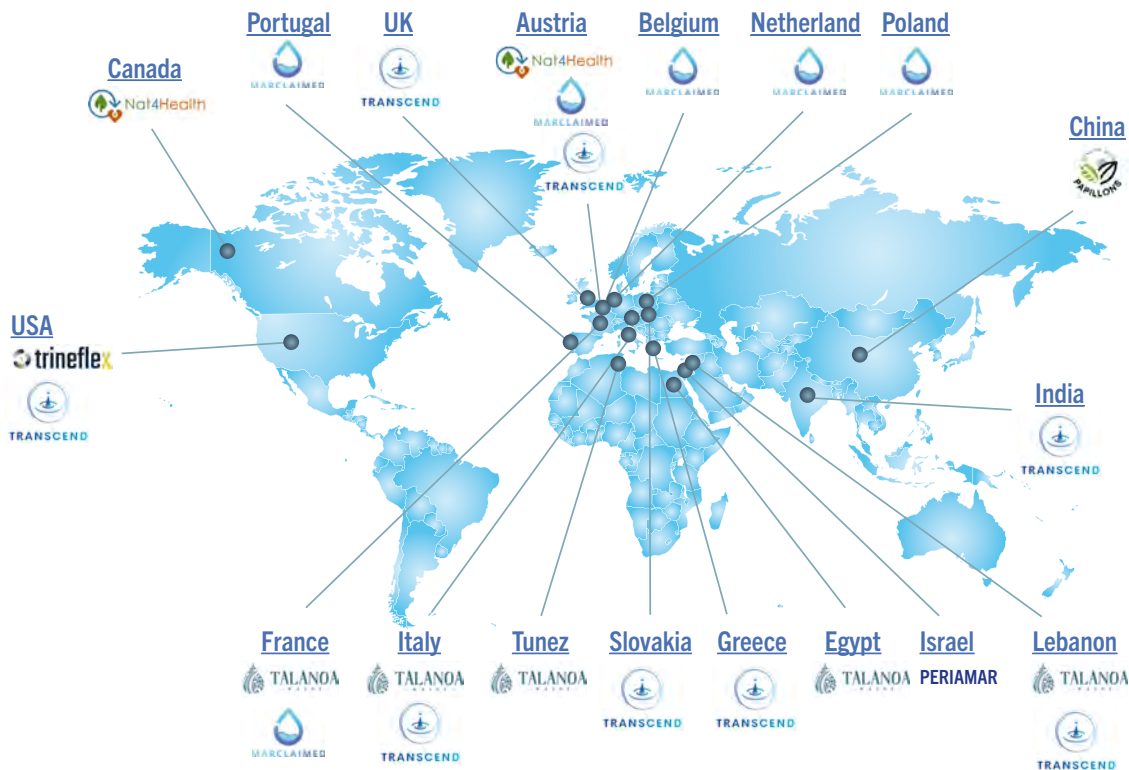


EUROPEAN UNION
European Regional Development Fund

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



**Aquatic Ecology
and Biotechnology**



**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

Dr. Eloy García Calvo
Main Researcher



Dr. Serena Molina Martínez
Researcher



Dr. Junkal Landaburu Aguirre
Researcher



Francesca Nonoi
Research Support



Ana Rubio López
Research Support



Anamary Pompa Pernía
Predoctoral Researcher



Marta González Jiménez
Research Support



Laura Rodríguez Saez
Research Support



Adrián González García
Research Support



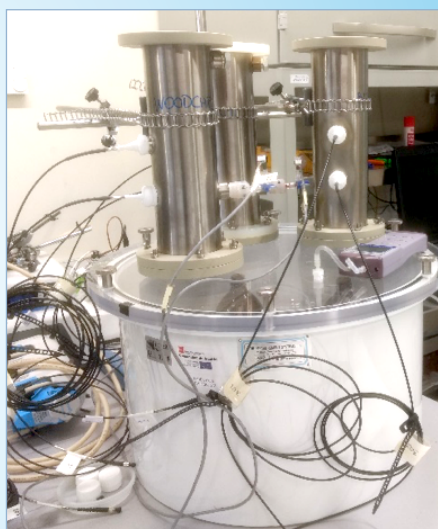
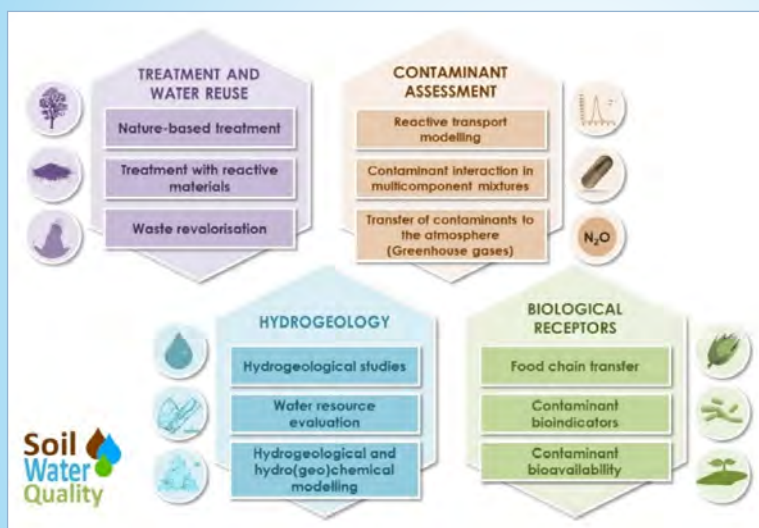
Imane Fellahi
Predoctoral Researcher

Associated Researchers



Dr. Mohamed Khayet

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/>

Dr. Irene de Bustamante Gutiérrez
Main Researcher



Dr. Ana de Santiago Martín
Researcher



Dr. María de las Virtudes Martínez Hernández
Researcher



Dr. Raffaella Meffe
Researcher



Lucía Barbero Morales
Research Support



**Soil and Water Quality
in the Environment**

Ana García Arcos
Research Support



Isabel Domarco Sagra
Predoctoral Researcher



Cynthia Rieckhof Rivas
Predoctoral Researcher



Silvia Paralluelo Lahoz
Research Support



Lesly Ayala Cabana
Predoctoral Researcher



María Gracia Zangroniz
Research Support



**Associated
Researchers**

Dr. Lucila Candela



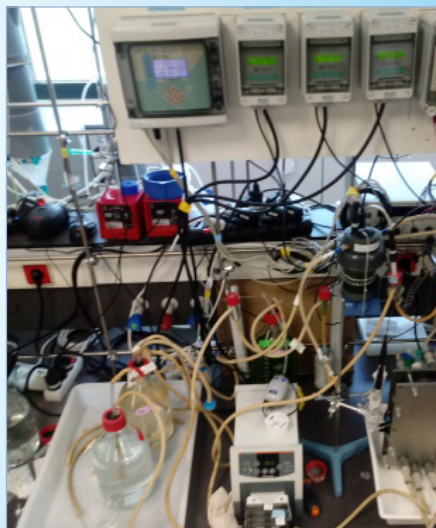
Dr. Juan Antonio Pascual Aguilar



Raúl Jerónimo Pradana
Predoctoral Researcher



Bioe



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/>

Dr. Antonio Berná Galiano
Researcher



Dr. Abraham Esteve Núñez
Main Researcher



**Dr. Juan Manuel Ortiz
Díaz-Guerra**
Researcher



Francisco Pablo Gómez Romero
Research Support



Daniela Torruella Salas
Predoctoral Researcher



Bioe



Ana Jesús Vega de Armas
Research Support



Belén Barroeta
Science Communicator



María Posada García
Research Support



Colin Wardman
Research Support



Sheila de Pablo Casas
Predoctoral Researcher



Sara Mozo Pacheco
Predoctoral Researcher



**Associated
Researchers**



Dr. Karina Boltes Espínola



Mario Jiménez Conde
Predoctoral Researcher



Silvia Blázquez
Predoctoral Researcher



Sara Gómez Gómez
Research Support

Aquatic ecology and biotechnology



The Aquatic ecology and biotechnology group addresses (i) the impacts of environmental stressors on aquatic and terrestrial ecosystems at different trophic levels (from microbial communities to organisms higher in the food chain), (ii) the risk assessment of these stressors for ecosystems, and (iii) the development of nature-based solutions and technologies to mitigate their impacts. Specifically, there are four lines of research with active projects:

1. Risk assessment for aquatic and terrestrial ecosystems derived from environmental stressors (e.g., microplastics, additives, salt pollution).
2. Microbial ecology of aquatic and terrestrial ecosystems, with an emphasis on the detection and management of cyanobacterial blooms and cyanotoxins using nature-based solutions (e.g., bioaugmentation).
3. Assessment of the impacts of aquatic stressors on terrestrial biodiversity (e.g., emergence of aquatic-terrestrial insects, pollinating insects) and the ecosystem services they provide (e.g., pollination, food production, crop pest control, nutrient transfer).
4. Studies of the impact of contaminants (pesticides, antibiotics, and biocides) on microorganisms in aquatic environments, as well as the development of antibiotic resistance.

Dr. Pablo Urrutia Cordero
Main Researcher



Dr. M^a Ángeles Lezcano Vega
Researcher



Dr. Paula Redondo Hasselerharm
Researcher



Dr. María Blanca Sánchez
Researcher



Lorena Martínez García
Research Support



Daniel Franco López
Research Support



Carla Morales Pujante
Predoctoral Researcher



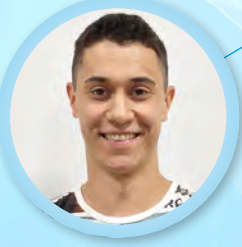
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Predoctoral Researcher



Ana Almodóvar Pérez
Research Support



Sara Martínez Pérez
Predoctoral researcher



Mario Márquez Toribio
Research Support



Mónica Gámez Rábano
Research Support

Sandra Amate Pariente
Research Support



**Aquatic ecology
and biotechnology**

**Associated
Researchers**



Prof. Marco Vighi



Dr. Jesús Morón López



Dr. Andreu Rico Artero

Economic and Institutional Analysis

48

annual report
2024



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



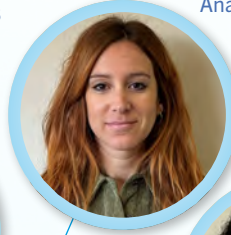
Dr. Leonor Nozal Martínez

Quality and Laboratories
Management / Laboratory
responsible



Dr. Laura Cherta Cucala

Head Of The Chemical
Analysis Service And The Soil
Analysis Service



Dr. Iame Alves Guedes

Head of the Biological
Analysis Service



Carolina Guillén Fuentes

Laboratory Technician



Dr. María Argudo Fernández

Laboratory Technician



Dr. María Isabel López Heras

Head Of The Chemical Analysis
Service And The Soil
Analysis Service



laboratory staff



Silvia Sánchez González

Technician Support



Isabel Fernández Artime

Laboratory Technician



Santiago Virseda Mayoral

Research Support



Alejandra Arcas Perea

Laboratory Technician



Ana Isabel Morato Cerro

Laboratory Technician



Rubén Martín Pacheco

Laboratory Technician



Dr. Juan Carlos García Mesa

Research Support



Alejandro Brenlla Gómez

Technician Support



Leidy Viviana

Laboratory Technician



Dr. Beatriz Gallego Fernández

Technician Support



Álvaro Macías De la Rosa

Research Support

Francisco Martínez Serrano

Laboratory Technician



Gloria Teijón Ávila

Technician Support

Mari Luz Barquilla Crespo
Economic Manager



Rafael Irastorza Vaca
General Manager



Dr. Juana Sanz García
R&D Manager



Gloria Rubio Sánchez
R&D&I Management
Support Technician



José Ángel Gómez Martín
R&D&I Management
Support Technician

**management area
and administration**



Celia Barral Nieto
Technician in Economic
and Administration



Catalina Nicoleta Nita
Administrative and Accounting
Management Support Technician



Josefa Simón Recio
Secretary



Esther Solera Santiago
Accounting Technician



Lucía Alvaredo Olmos
R&D&I Management
Support Technician



Research results and knowledge dissemination

1. **Scientific Papers [53]**
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1. Scientific Papers

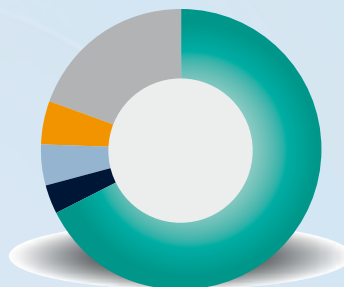
1.1 Articles in journals 

1.2 Other articles 

1.3 Books 

1.4 Book chapters 

1.5 Scientific-Technical Reports 



 **42** Articles in journals (31 in Q1)

 **2** Other Articles

 **3** Book

 **3** Book Chapters

 **2** Scientific-Technical Reports



2. Lectures (15)



3. Round tables and experts panels (26)



4. Participation in Scientific Committees

We have participated in a total of 28 Scientific Committees. Some examples are:

- CIRcularidad para un Mundo Abierto Transversal CIRMAT24
- One Health Platform
- VI Congreso Nacional del Agua: “Agua, Agricultura y Alimentación”
- WG-4 MP Microplastics. Norman Network
- Comité CTN 318 RIEGOS del Ministerio de Agricultura, Pesca y Alimentación. Ministerio para la transición ecológica. International Standard Organization (ISO)
- WG Emerging Compounds del Water Supply and Sanitation Technology Platform – WssTP



5. Conference

5.1 Oral Communications

14 researchers have participated in a total of 14 Scientific Events. Some examples are:

- International Congress MICRO2024: From Macro to Nano
- XXVIII International Symposium on Bioelectrochemistry and Bioenergetics of the Bioelectrochemical Society - BES2024
- Euromembrane Congress 2024. European Membrane Society

5.2 Posters

We have participated with 16 posters in some events like:

- 39th European Membrane Society Summer School
- 4th IWA-YWP Spain National Conference
- British Ecological Society Annual Meeting 2024- Environmental Physiology
- 4th International Meeting Biochemical Foundation of Microbial Extracellular Electron Transfer - BioCheMeet 2024



6. Fellowships

- Researcher from Regional Science Programme “Talent Attraction”:

Pablo Urrutia Cordero

Grant 2022-T1/AMB-24063 funded by:



Comunidad de Madrid

- Researcher from Juan de la Cierva-Formación Programme.

Paula Elisa Redondo Hasselerharm

Grant FJC2020-045328-I funded by:



- 15 Research Support from Regional Programme INVESTIGO: Sandra Amate Pariente, Mónica Gámez Rábano, Marta González Jiménez, Juan Carlos García Mesa, Mario Márquez Toribio, Francisco Pablo Gómez Romero, María Gracia Zangroniz, Silvia Paralluelo Lahoz, Álvaro Jesús Macías de la Rosa, María Posada García, Gloria López Morales, Sara Gómez Royo, Adrián González García, Ana Almodóvar Pérez, Alejandro Brenlla Gómez

Contracts funded by the European Union – Next Generation EU, through the “Investigo Program”, within the framework of the Recovery and Resilience Mechanism of the European Union.



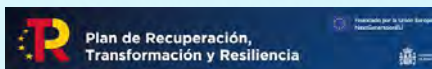
Financiado por la Unión Europea
NextGenerationEU



Comunidad de Madrid

- 7 Research Support from Statal Programme INVESTIGO: Ana García Arcos, Daniel Franco López, Daniela Torruella Salas, Imane Fellahi, Isabel Fernández Artime, Lorena Martínez García

Contracts funded by the European Union – Next Generation EU.



- 3 Predoctoral Researcher from Community of Madrid Programme: Sara Mozo Pacheco, Imane Fellahi and Isabel Domarco Sagra

Grants PIPF-2023/ECO-30804, PIPF-2022/ECO-26357 and PIPF-2023/ECO-30804:



Comunidad de Madrid

- Predoctoral Researcher from National Science Programme: Anamary Pompa Pernía

Grants PRE2019-088421 funded by:



- 3 Research Support:

Gloria Teijón Ávila, Silvia Sánchez González and Beatriz Gallego Fernández

Grants PTA2020-019363-I, PTA2022-022494, and PTA2023-023255 funded by:





7. Phd Thesis

PhD thesis defended

1. **Marina Ramírez Moreno.** Microbial Desalination Cells for fresh water production: towards the implementation of sustainable desalination Technology. Director: Abraham Esteve Núñez 22/03/2024
2. **Ting Wei.** Developing modular constructed treatment wetland: the idea, the strategy and the reality. Director: Abraham Esteve Núñez 17/05/2024
3. **Raúl Jerónimo Pradana Yuste.** Generando biomasa con Aguas regeneradas: Oportunidad para la bioeconomía circular Directors: Irene de Bustamante, Borja Daniel González and Hortensia Sixto Blanco 15/07/2024
4. **Claudia Martínez Megías.** New approaches for assessing the impacts of chemical pollution and climate change in the Albufera Natural Park (Valencia, Spain). Director Andreu Rico Artero 19/07/2024
5. **Mario Jiménez Conde.** Electrobioremediation strategies for removing nitrogen and emerging pollutants in urban wastewater: the metland solution as tertiary and quaternary treatment. Director: Abraham Esteve Núñez 27/07/2024
6. **Andrés Escare Ruminot.** Metodología para la estimación de la huella hídrica en campañas de exploración de cobre en escenarios de variabilidad geológica. Director Héctor Valdés González 25/09/2024
7. **Akram Gashtasebi.** Microbial Electrochemical Strategies for recovering nutrients after treating and re-using urban wastewater from a University Campus. Director: Abraham Esteve Núñez and Karina Boltes Espínola 11/10/2024

8. **Laura Rodríguez Sáez** Implementation of Recycled Ultrafiltration Membranes in Membrane Bioreactor (MBR) for Wastewater Treatment Directors: Serena Molina Martínez and Junkal Landaburu Aguirre 04/12/2024

PhD Thesis in progress

1. **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. Director: Irene de Bustamante Gutiérrez.
2. **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.
3. **Anamary Pompa Pernía.** Tratamientos terciarios de aguas residuales mediante sistemas basados en membranas recicladas. Directors: Serena Molina Martínez and Junkal Landaburu Aguirre
4. **Christian García Rengifo.** Análisis de índices de sequía meteorológica en las dos principales fuentes de abastecimiento de agua potable para el Distrito Metropolitano de la ciudad de Quito – Ecuador. Director: Xavier Zapata Ríos
5. **Colin Daniel Wardman.** Electroactive Biofilters and Adapting Microbes for their use. Director: Abraham Esteve Núñez.
6. **Cynthia Emilia Rieckhof Rivas.** Destino y transporte de los micronanolásticos a través del suelo y su potencial llegada al agua subterránea. Directors: M^a de las Virtudes Martínez Hernández and Raffaella Meffe.
7. **Daniela Victoria Torruella Salas.** Sensores electroquímicos microbianos: nueva perspectiva para la monitorización de la calidad del agua. Director: Abraham Esteve Núñez.
8. **Eduardo Noriega Primo.** Tecnologías electroquímicas microbianas aplicadas al tratamiento de aguas residuales industriales. Director: Abraham Esteve Núñez.
9. **Felicia Mabel Díaz Cubilla.** Efecto de contaminantes emergentes sobre procesos anaerobios de tratamiento de agua residual. Directors: Pedro Letón García and Karina Boltes Espínola.

10. Fernando Muniesa Merino. Biofactorías “Púrpura”: Estrategias bioelectroquímicas para revalorizar el agua residual de cervecera mediante microorganismos fototróficos púrpura. Director: Abraham Esteve Núñez.

11. Ignacio Lozano Colmenarejo. Estudio y propuesta de un indicador global en la regulación de la calidad de los servicios urbanos del agua en España. Director: Alberto del Villar García.

12. Imane Fellahi. Eliminación de contaminantes emergentes en aguas residuales mediante sistemas de membrana. Directores: Junkal Landaburu Aguirre and Serena Molina Martínez.

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

14. José Francisco Sigüenza García. Tratamiento eficiente de las aguas negras e incineración del residuo en la respuesta humanitaria de emergencias en salud. Directores: Pedro Letón García and M^a Eugenia Moya Palomares

15. 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 Moínolo.

16. Lesly Antonieta Ayala Cabana. Contaminantes de preocupación emergente en el escenario agrícola: ¿Riesgo para la salud o atenuación natural? Directores: Ana de Santiago Martín and Raffaella Meffe

17. Lucía Barbero Morales. Regeneración de aguas mediante filtros verdes. Condicionantes hidrogeológicos Directores: Irene de Bustamante Gutiérrez and Virtudes Martínez Hernández.

18. Lorena Martínez García. Papel del agua en la dispersión de bacterias resistentes. Directores: M^a Blanca Sánchez Martínez and Ana de Santiago Martín

19. Marina Bastante Rabadán. Eliminación bioelectroquímica de micro y nanoplasticos del agua residual. Director: Ana Karina Boltés Espínola

20. Mario Arturo 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 and Juan Antonio Pascual Aguilar.

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

22. Raisa Gabriela Salvi Taga. La Modelización Numérica como Herramienta para Describir el Destino de los Contaminantes de Preocupación Emergente a través del Suelo. Directores: Raffaella Meffe and M^a de las Virtudes Martínez Hernández.

23. Sara Martínez Pérez. Environmental fate and risks of micronanoplastics in the soil-water interface. Directores: Andreu Rico Artero and M^a Virtudes Martínez Hernández.

24. Sara Mozo Pacheco. Desarrollo de biosensores basados en la biología sintética y bioimpresión 3D. Director: Abraham Esteve Núñez.

25. 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 and Antonio de Lucas Sepúlveda.

26. Sergio Álvarez Blanco. Aplicación de modelos hidrológicos latinoamericanos en cuencas europeas, calibración en el caso de la cuenca del río Madarquillos. Directores: Juan Antonio Pascual Aguilar and Juan José Castro Ríos.

27. Sheila de Pablo Casas. Sensores electroquímicos microbianos como herramienta para la monitorización de la calidad del agua. Directores: Abraham Esteve Núñez and Antonio Berná Galiano

28. Silvia Blázquez Hernández. Nuevas estrategias bioelectroquímicas para la producción sostenible de agua regenerada, recuperación de nutrientes y su uso en cultivo hidropónico. Director: Abraham Esteve Núñez

29. Virginia Gálvez Blanca. Distribución ambiental y toxicidad de microplásticos y nanoplasticos. Directores: Roberto Rosal García and Alice Petre Bujan.





8. Internships

1. **Centre:** University Complutense of Madrid (Spain)
Date: 08 – 12/01/2024
2. **Centre:** Antonio Nariño University (Colombia)
Date: 22/01/2024 – 02/02/2024
3. **Centre:** IMDEA Energy Madrid (Spain)
Date: 30/07/2024 – 02/08/2024
4. **Centre:** FHNW-University of Applied Sciences an Arts
Northwestern Switzerland (Suiza)
Date: 17/10/2024 – 20/12/2024
5. **Centre:** CRTSE- Centre de Recherche en Technologie des
Semi-conducteurs pour l'Energétique (Algelia)
Date: 22/-31/10/2024
6. **Centre:** University of Aveiro (Portugal)
Date: 21/10/24-29/11/24



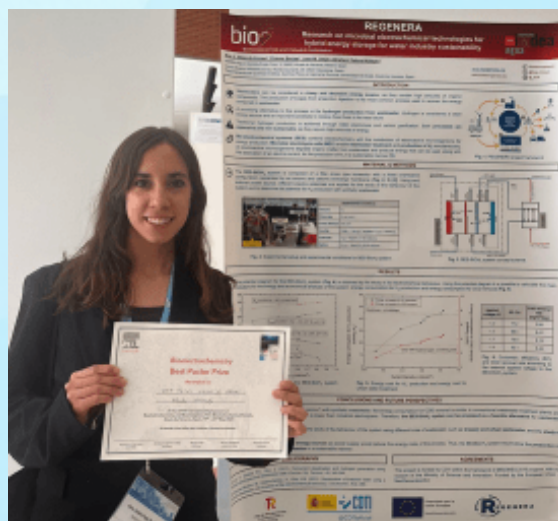
9. RTD activities organization

1. Dynamization of R&D&I projects in the water cycle. SENTIATECH Platform
2. Jornadas sobre Contaminación de las aguas subterráneas. Avances científicos y tecnológicos en el diagnóstico, prevención y remediación (CONTAS 2024).
3. IMDEA Water Scientific Symposium



10. Awards, Merits and Recognitions

1. IMDEA Water Institute renews its 400+ international certification for its excellent, innovative and sustainable management based on the EFQM Model of the Club de Excelencia en Gestión. April 2024.
2. Elsevier 2nd Best Poster Award. Vega, A.J., Borjas, Z., Ortiz, J.M., Esteve-Núñez, A., REGENERA: Research on microbial electrochemical technologies for hybrid energy storage for water industry sustainability. XXVIII International Symposium on Bioelectrochemistry and Bioenergetics of the Bioelectrochemical Society - BES2024. University of Alcalá. 19 - 23/05/2024.
3. Eloy García Calvo receives the Honorary Silver Medal of the University of Alcalá (UAH) during the opening of the new academic year. 05/09/2024.
4. Rafael Fernández Rubio, Chairman of the Board of Trustees of IMDEA Agua, receives the National Mining and Life 2024 Career Achievement Award at the 5th edition of the International Mining & Metallurgy Hall. 15 - 17/10/2024.
5. Belén Barroeta and Karina Boltes receive a favorable evaluation as a teaching innovation group of excellence from UAH-GI20-147 Challenges of the teacher in Chemical and Environmental Engineering. Vice-rectorate for Teaching Innovation and Digital Transformation, UAH. Resolution date: 13/12/2024.

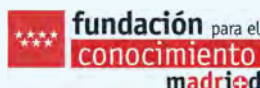


11. Other Institutional Activities

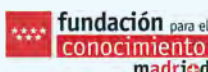
- Red de Laboratorio e Infraestructuras Científico-Técnicas de la Comunidad de Madrid- RLAB-002



- Participation. XXIV Science and Innovation Week. Madrid, Spain. 2024



- Participation. XV European Researchers' Night. Madrid. Spain. 2024



- Member of Euraxess Service Network. Local Contact Point



- Participation. Feria Madrid Es Ciencia 2024



- Participation. Feria Transfiere 2024



12. Platforms and associations



13. IMDEA Water in the Media

A total of 105 news items were published in 77 different media outlets (68 of these in the regional and national area and 9 in the international area). In addi-

tion, 11 interviews and video stories were published in the media, including ABC, El Mundo or El País.



