just water

imdea **water** institute

annual report 2016

www.water.imdea.org

institute IMdea water

foreword

Eloy García Calvo
Director, IMDEA water Institute
April 2017

For IMDEA Water, the year 2016 saw consolidation of the growth that began a year earlier with the Institute's transfer to its definitive headquarters. The number of researchers has grown by 15%, and the number of projects and contracts has also risen by similar figures. These developments are accompanied by greater scientific-technical production both in figures and researcher productivity. For example, we may highlight the approval of three patents, the publication of three extensions to as many other countries of an international patent, and the submission of another two.

It is remarkable the incorporation of a new research group in ecotoxicology. Despite the difficulties of launching a new line of action, they were able to deal with that difficulties and the research group is currently fully immersed in two new European projects.

In 2016, the infrastructures designed outside the building were completed. There are two types of infrastructures. One is an experimental station for the creation of mesocosms for investigating ecosystems in conditions that provide results very close to the natural ecosystems. Others include bioelectrogenic fixed beds and wetlands, and modified land application systems. Our objective is the treatment of wastewaters generated in the institute with our own treatment technologies developed or improved in-house.

The technology-based company, partly owned by the Institute and created to market bioelectrogenic technologies, has set up a facility for wastewater treatment with the capacity to treat a load equivalent to a population of 200, and will soon be marketing a wastewater treatment system for the petrochemical industry.

Training continues to be an important activity for our Institute. We continue to coordinate a Master's degree programme in two versions, face-to-face and semi-virtual learning, as well as a PhD programme. These programmes are held in collaboration with the Universities of Alcalá and Rey Juan Carlos. Both programmes are fully consolidated, and the number of students interested is growing so steadily each year that a good number of the applicants have to be ruled out. Researchers from IMDEA Water also participate in other master's degree and PhD programmes.

Additionally, in 2016 our dissemination and outreach activities increased substantially. These are activities that we try to promote and to strengthen every year.

Finally, I would like to again thank all the people involved with IMDEA Water for their commitment and effort. I wish to explicitly thank the members of the Institute who have shown their enthusiasm even in periods of great difficulty. With the commitment of all, the Institute continues to grow and consolidate.

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1.1. Presentation

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 through organising and collaborating in doctorate programmes, masters and other courses, thus helping to compensate society for the effort made in maintaining the Institute.

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 place among the regions generating knowledge and facilitating innovation, by providing solutions to problems and challenges in water management.

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.

Photos 1-2. Headquarters

1.2. Management structure

The main governing body of IMDEA Water is the Board of Trustees. The Board appoints the Director, who is assisted by the Deputy Director. Both the Director and Deputy Director are assisted by the manager who takes care of the legal, administrative and financial activities of the institute (Figure 1).

A Scientific Council assists the Board of Trustees and Directors in their functions. Council tasks include the selection of researchers and assessing the scientific activities of the researchers and the institute as a whole to ensure research excellence.

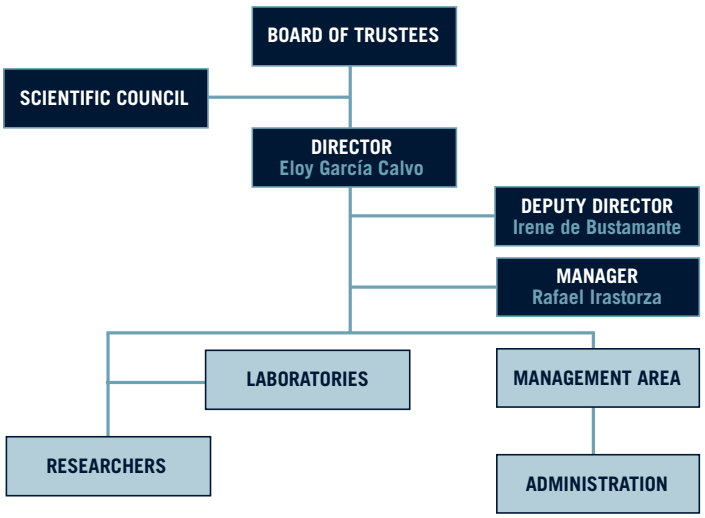

Figure 1. IMDEA Water management structure

1.3. Governing bodies

1.3.1. Board of Trustees

The Institute is governed and managed by a Board of Trustees comprising a President, a Vice-president, Trustees and a Secretary.

PRESIDENT

Mr. Rafael Fernández Rubio
Dr. in Mining Engineering
Professor Emeritus of Madrid Polytechnic University. Spain
Rey Jaime I Prize for Environmental Protection
Doctor Honoris Causa of University of Lisbon. Portugal

EX OFFICIO TRUSTEES (GOVERNMENT OF MADRID)

Mr. Rafael van Grieken Salvador
Counsellor of Education, Youth and Sport
Regional Board of Education, Youth and Sport
Regional Government of Madrid. Spain

Mr. José Manuel Torralba Castelló
General Director of Universities and Research
Regional Board of Education, Youth and Sport
Regional Government of Madrid. Spain

Mr. Rafael A. García Muñoz
General Subdirector of Research. Directorate General of Universities and Research. Regional Board of Education, Youth and Sport
Regional Government of Madrid. Spain

Mr. José de la Sota Ríus
Scientific Technical Coordinator
Fundación para el Conocimiento madri+d
Madrid. Spain

ELECTIVE TRUSTEES (INSTITUTIONAL MEMBERS)

University of Alcala. Alcala de Henares. Madrid. Spain
Prof. Dr. Juan José Vaquero López

Rey Juan Carlos University. Madrid. Spain
Prof. Dr. José Aguado Alonso

Complutense University. Madrid. Spain

Gabriel Ovejero Escudero

ELECTIVE TRUSTEES (PRESTIGIOUS SCIENTISTS)

Mr. Rafael Fernández Rubio
Dr. in Mining Engineering
Professor Emeritus of Madrid Polytechnic University. Spain
Rey Jaime I Prize for Environmental Protection
Doctor Honoris Causa of University of Lisbon. Portugal

Mr. José C. Merchuk
Departament of Chemical Engineering and Biotechnology Unit, Engineering Sciencies Faculty
Ben-Gurion University of Negev. Beer Sheva. Israel

ELECTIVE TRUSTEES (EXPERT MEMBERS)

Mr. Manuel Ramón Llamas Madurga
Director of the Water Observatory of the Botin Foundation
Professor Emeritus. Complutense University. Madrid. Spain
Permanent Member of the Royal Academy of Exact, Physical and Natural Sciences, Madrid. Spain

Mr. Adriano García-Loygorri Ruiz
President of the Social Council. Polytechnic University of Madrid
Permanent Member of the Royal Academy of Exact, Physical and Natural Sciences, Madrid

ELECTIVE TRUSTEES (COMPANIES)

CANAL DE ISABEL II GESTIÓN
Mr. Fernando Arlandis Pérez.
Subdirector of Studies, Programmes and Corporative Social Responsibility
Spain

SACYR VALLEHERMOSO-VALORIZA AGUA
Mr. Domingo Zarzo Martínez. R&D Technical Director. Murcia. Spain.

ASOCIACIÓN DE EMPRESARIOS DEL HENARES (AEDHE)
Mr. Jesús Martín Sanz. President
Alcalá de Henares. Madrid. Spain

AQUALIA. INTEGRAL WATER MANAGEMENT
Mr. Enrique Hernández Moreno.
Director of Services

SECRETARY

Mr. Alejandro Blázquez Lidoy

Update as at 31/12/2016

1.3.2. Scientific Council

The Scientific Council is constituted as follows:

Mr. Rafael Fernández Rubio
Dr. in Minning Engineering Professor Emeritus of Madrid, Polytechnic University. Spain. Rey Jaime I Prize for Environmental Protection. Ful Professor and Doctor Honoris Causa of University of Lisbon

Mr. José C. Merchuck
Departament of Chemical Engineering and Biotechnology Unit, Engineering Science Faculty. Ben-Gurion University of Negev. Beer Sheva. Israel

Mr. M. Ramón Llamas Madurga
Director of the Water Observatory of the Botín Foundation Professor Emeritus. Complutense University. Madrid. Spain Permanent Member of the Royal Academy of Exact, Physical and Natural Sciences, Madrid. Spain

Mr. Félix Cristóbal Sánchez
Highway, Canal and Port Engineer Canal de Isabel II Administration Committee. Spain

Mr. Bo Jansson
Professor Emeritus. Stockholm University

Mr. Emilio Custodio Gimena
Full Profesor. Polytechnic University of Catalunya. Spain

Mr. Paul L. Younger
Rankine Chair of Engineering. School of Engineering. JAmes Watt South Building. University of Glasgow. UK

Mr. J. A. Allan
Department of Geography, King's College London, The Strand Centre of Near and Middle Eastern Studies, School of Oriental and African Studies, London, UK

Mr. Domingo Zarzo Martínez
Technical Director Murcia. Spain SACYR VALLEHERMOSO-VALORIZA AGUA

Mr. Frank Rogalla
Director of Innovation and Technology. Madrid. Spain AQUALIA. INTEGRAL WATER MANAGEMENT

Update as at 31/12/2016

research

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Projects

2.1. Urban and Industrial Wastewater Treatment

2.1.1. A new generation of Microbial Electrochemical Wetland for effective decentralized wastewater treatment (iMETland)

http://www.imetland.eu

iMETland project aims at unleashing the small community economies potential through innovative wastewater treatments technologies, creating a virtuous circle connecting water, energy, ICT, land resources and safeguarding the environment. The project maximises the innovation potential of the following technical features, to be tested and validated at four different geographical locations: Mediterranean (Spain), North-Europe (Denmark), South-America (Argentina) and North-America (Mexico). iMETland innovation stands in the balanced integration of technologies, which are wisely amalgamated in the environment. Exploiting the combination of water sector, energy, ICT and land resources, the project paves the way to solve small communities wastewater treatment needs in a cost effective, energy efficient and environmental friendly manner. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 642190.

2.1.2. Microbial Desalination for Low Energy Drinking Water (MIDES)

http://midesh2020.eu/

Shortage of fresh water has become one of the major challenges for societies all over the world. Water desalination offers an opportunity to significantly increase the freshwater supply for drinking, industrial use and irrigation. All current desalination technologies require significant electrical or thermal energy, with today's Reverse Osmosis (RO) desalination units consuming electric energy of at least 3 kWh/m^3 – in extensive tests about ten years ago, the Affordable Desalination Collaboration (ADC) in California measured 1.6 kWh/m^3 for RO power consumption on the best commercially available membranes, and total plant energy about twice as high.

To overcome thermodynamical limitations of RO, which point to 1,09 kwh/m^3 for seawater at 50 % recovery, Microbial Desalination Cells (MDC) concurrently treat wastewater and generate energy to achieve desalination. MDCs can produce around 1.8 kWh of bioelectricity from the handling of 1 m^3 of wastewater. Such energy can be directly used to i) totally remove the salt content in seawater without external energy input, or ii) partially reduce the salinity to lower substantially the amount of energy for a subsequent desalination treatment. MIDES aims to develop the World's largest demonstrator of an innovative and low-energy technology for drinking water production, using MDC technology either as stand-alone or as pre-treatment step for RO.

The project focuses on overcoming the current limitations of MDC technology such as low desalination rate, high manufacturing cost, biofouling and scaling problems on membranes, optimization of the microbial electrochemical process, system scaling up and economic feasibility of the technology. This will be achieved via innovation in nanostructured electrodes, antifouling membranes (using nanoparticles with biocide activity), electrochemical reactor design and optimization, microbial electrochemistry and physiology expertise, and process engineering and control.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 685793.

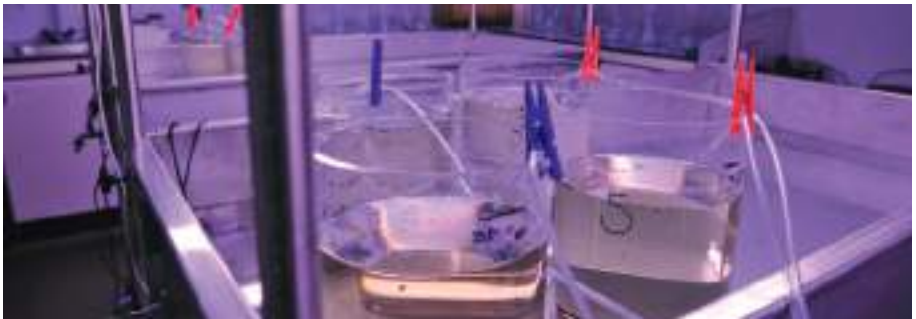
2.1.3. Advanced Nutrient Solutions With Electrochemical Recovery (LIFE ANSWER)

The purpose of this project is to demonstrate the technical and economic feasibility of electrocoagulation and bioelectrogenic microbial treatments in medium to small industry wastewater treatment plants for zero effluent discharge. These treatments can solve the environmental problem from that kind of industries, one of the main wastewater generators right now.

The project will be developed in one of the most important beer production plant of Europe (Alovera, property of MAHOU) at a demonstration scale treating real wastewater effluent in such a way that the feasibility of a solution reproducible to other areas will be shown, involving the main stakeholders (food and drink industries, local entities, and water public bodies) during the project implementation.

2.1.4. Microbial electrochemical strategies oriented to a sustainable and decentralized urban waste water reuse y (MET4HOME)

MET4HOME aims to take advantage of the metabolism of these microorganisms to change the paradigm of decentralized water purification through the design, construction and validation of a compact prototype designed to purify and disinfect the water generated by an isolated dwelling (up to 8 eq/inhab) Allowing its reuse for irrigation, sanitary tanks, etc. Taking advantage of the use of electrochemical instrumentation, we will install an electrodisinfection system for the elimination of pathogens.



2.1.5. National network of microbial electrochemical technologies. IBERIMET

http://iberimet.net/

The recent discovery of microorganisms able to have a redox communication with electrically conductive materials has generated a new scientific field under the umbrella of the so-called Microbial Electrochemical Technologies. The aim of IBERIMET is to set-up a work group with all the national active groups in the field. From the very beginning (2003) Spanish researchers showed interest in playing an important role in this newborn discipline. After one decade, Spain is the European country with the largest number of researchers in the field, and Spanish teams coordinate H2020 projects MET-based.

The nature of METs is based on three disciplines that rarely converge at high level in the same research group: microbiology, engineering and electrochemistry. IBERIMET will be a key tool for facilitating the interaction among groups with two main objectives:

- Accelerate the technological development of METs through enhancing the synergism between the partners.
- Achieve larger application scale (full scale) to make METs attractive technologies with interest for the industrial sector.

2.1.6. Consolider Tragua Network (TRAGUANET)

http://www.consolider-tragua.com/

In December 2014 the Consolider Tragua Network (TRAGUANET) became operational. This network is funded by the MINECO in the last call for Networks of Excellence "Consolider". During two years TRAGUANET will allow the communication and collaboration among the 24 groups that were part of the project Consolider Tragua.

Traguanet continues to make progress in existing lines related to the reuse of purified wastewater in an integrated manner. Moreover, new lines will be opened as, for example, water reuse for human consumption, the water-energy binomial, the impact of nanotechnologies and nanomaterials, and the impact of reuse on climate change.

The network is open to public and private, national and foreign institutions. Dissemination and outreach efforts are also being enhanced to promote a change of trend in the social perception of "water reuse" in order to be considered as an important resource rather than a waste product.

2.1.7. Madrid Advanced Wastewater Treatment Network with Non-Biodegradable Pollutants (REMTAVARES 3) http://www.remtavares.com/

REMTAVARES 3 is the reference point in terms of advanced technologies in wastewater management to ensure sustainable development for the Community of Madrid.

The lines of research that support these technologies are: treatment advanced technologies (physical, membrane, advanced oxidation and chemical processes) and testing the ecotoxicological effects of pharmaceutical compounds on surface and groundwater crustaceans.

2.1.8. Meeting Microbial Electrochemistry for water (MEET-ME4water) http://www.eip-water.eu/MEET_ME4WATER

MEET-ME4WATER focuses on overcoming the barriers to scale-up and demonstration of microbial electrochemical technologies (METs) and bring them faster to market. These technologies treat wastewater and, at the same time, produce value added products (chemicals, H_2, and/or desalinate water at zero energy cost simultaneously) whilst producing energy. METs have a well explored innovation potential for sustainable development of wastewater treatment systems. Further work is needed to fully control the engineering and biotechnological aspects of these systems at larger scale.

2.1.9. Development of Microbial Electrogenic Technologies for removal of emerging pollutants from wastewater (EM4EM)

EM4EM aims to evaluate the role of microbial electrogenesis in the biodegradation of emerging pollutants. The modus operandi includes the high-tech analysis of emerging pollutants after our electrogenic treatment, the perfomance of ecotoxicological assays, the selection and characterization (Genomes sequencing analysis) of populations able to degrade emerging pollutants.

The strategy is not just limited to carry out assay at lab scale. The research team has developed a fullscale artificial electrogenic wetland which is dairy fed with urban wastewater and placed at CENTA facilities (Carrión de los Céspedes, Seville). This innovative device is a unique tool to assay the effect on conductive material on emerging pollutants biodegradation under real conditions. The use of electrodes in the system allow us to design and extra treatment to electrodisinfection of the outlet water.

2.2. Reclaimed Water Reuse

2.2.1. Water reclamation by using a new concept of land application systems (FILVER+)

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

With the reference CTM2016-79211-C2 (AEI/FEDER, EU), is funded by the State Research Agency (AEI) and the European Regional Development Fund ERDF), and is part of the 2016 call for R+D+i projects of the Ministry of Economy, Industry and Competitiveness.

FILVER+ project considers the development of an Amended Land Application System (ALAS) as a technology of secondary and tertiary treatments, to maximizing removal of nutrients, microparasites/pathogens and emerging pollutants, by application of low cost and easy acquisition amendments. That will give as result a reduction of the required surface for the IVF installation and an increase of the quality of the infiltrated water, thus diminishing the impact on the underlying aquifer. The project is oriented to the search of solutions to fulfil the environmental objectives required by the Water Framework Directive, as it is recorded in the Actions Program included in the Hydrological Plans of River Basins for the Second Cycle (2015-2021), for which an investment of more than seven thousand millions of euros is planned.

2.3. Economic and Institutional Analysis

2.3.1. Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services Across EU Policies. AQUACROSS

http://aquacross.eu/

This project aims to support EU efforts to protect aquatic biodiversity and ensure the provision of aquatic ecosystem services. Funded by Europe's Horizon 2020 research programme under Grant Agreement no. 642317, AQUACROSS seeks to advance knowledge and application of ecosystem-based management (EBM) for aquatic ecosystems to support the timely achievement of the EU 2020 Biodiversity Strategy targets.

To do this, AQUACROSS considers the EU policy framework for aquatic ecosystems and builds on knowledge stemming from different sources to develop innovative management tools, concepts and business models for aquatic ecosystems.

The AQUACROSS approach is built around four pillars of work and eight case studies:

- Pillar 1: Real-world testing—the project will ensure stakeholder engagement, knowledge exchange and social learning to achieve practical policy solutions and end-user uptake.
- Pillar 2: Giving direction—it is important to understand the current political setting in order to facilitate policy coordination across aquatic ecosystems.
- Pillar 3: Increasing scientific knowledge—work under this pillar will develop and test protocols and guidance materials for testing the AQUACROSS AF in the case studies.
- Pillar 4: Improving management— building on the work undertaken in the previous pillars, this pillar aims to develop concepts, practices and tools for better implementation of EBM.

2.3.2. "River Restoration Benefits" (RiverRes)

http://www.eip-water.eu/RiverRes

The vision and mission of the RiverRes Action Group is to provide a Roadmap to address current policy challenges as opportunities for innovation through river restoration, as an example of nature based solutions. In particular, how river restoration can increase the effectiveness of EU directives and policy implementation. The current challenge -as identified in a number of documents like the EU Blueprint, the Biodiversity Strategy 2020, Climate Change Adaptation Strategy, Water Scarcity & Drought Policy, etc. is implementation and innovation.

Some of the policy challenges that can be tackled in an integrated manner include for example:

- Improving water quality: so that the positive ecosystem services from more natural river system are internalised in relation to water quality;
- Prevention against extreme events: river restoration actions to recover the lateral connectivity and floodplain are an effective Green infrastructure solution to contribute to flood control and to groundwater recharge;
- Protection of biodiversity: rehabilitating river systems contributes to restore the natural habitat of aquatic biodiversity.

RiverRes mainly targets projects that aim to reduce hydro-morphological pressures and facilitate the processes of "re-naturalization" of which allows -not only to improve their ecological status - but also to enhance the delivery of potential ecosystem services, under an integrated approach in the implementation of several EU Directives.

2.3.3. Smart Prices and Drought Insurance Schemes in Mediterranean Countries. (SPADIS)

http://www.eip-water.eu/SPADIS

SPADIS, standing for "Smart Pricing and Drought Insurance Schemes in Mediterranean Countries", focuses on the design and implementation of economic instruments with the best potential to induce individual decisions regarding water use in order to contribute to the collective goals of reducing vulnerability to water scarcity and increasing resilience to droughts risk. As an Action Group, it contributes to two priority areas of the Strategic Implementation Plan of the EIP-Water: flood and drought risk management, on one side; water governance, on the other.

SPADIS will develop the following innovative economic instruments to manage drought risk:

- A smart-pricing scheme for urban water in order to finance increased water security, enhancing the reliability of sufficient water supply during drought periods.
- An innovative drought insurance system for irrigated agriculture to stabilize agricultural income in order to increase the resilience of rural livelihoods and to reduce current incentives to use the already over-exploited groundwater sources as buffer stocks in dry periods.

2.4. Membrane Technology

2.4.1. Transformation of disposed reverse osmosis membranes into recycled ultra-and nanofiltration membranes http://www.life-transfomem.eu/

TRANSFOMEM is an European Community co-funding LIFE project with contract number LIFE13 ENV/ES/000751 coordinated by IMDEA WATER. It aims to develop an innovative recycling process for reverse-osmosis membranes disposed in landfills. End-of-life reverse osmosis membranes are transformed to lower pressure ultra-nanofiltration membranes in order to use them for wastewater treatment. LIFE TRANSFOMEM is framed in the "LIFE+ Environment Policy & Governance" component: pilot projects that contribute to the development of innovative policy ideas, technologies, methods and instruments.

2.4.2. Preparation, modification and characterization of pressure-driven membranes

The IMDEA Water membrane research group is focused on studying the whole membrane process life cycle: from membrane preparation, to their use in water treatment until their recycling. The group is developing new generation antifouling membranes by surface modification and the addition of nanoparticles. Further, water treatment by different types of membranes such as reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF) and microfiltration (MF) is carried and their process performance is evaluated. After recycling the membranes (project LIFE-TRANSFOMEM), the group studies the modification of recycled membranes in order to find new applications in wastewater treatments. As an example, there is an active collaboration with the REMTAVARES 3 project, where the membrane technology group is focused on the modification of recycled membranes for the removal of emerging compounds from hospital wastewater.

The group is also developing research on the characterization, fouling (membrane autopsy) and effectiveness of different cleaning treatments of commercial membranes.

The IMDEA Water membrane research group by its associated researcher from University Complutense of Madrid, works also on the fabrication, modification and characterization of different types of new-generation membranes for a wide variety of separation processes such as membrane distillation (MD), forward osmosis (FO) and pervaporation (PV) that are implemented at different environmental applications.

2.4.3. Innovation and recycling of membranes for water treatment (INREMEM)

http://inrememem.simplesite.com/

The main objective of the coordinated project INREMEM is to recycle disposed reverse osmosis membranes (at laboratory scale) and to transform them into membranes that will be used in the the treatment of waters from different sources: wastewater, surface water and osmotic solutions. For this reason, INREMEM studies 5 different techniques where the recycled membranes will be implemented: i) biomembranes (BM) for the treatment of surface water, ii) membrane bioreactors (MBR) for wastewater treatment, iii) forward osmosis for wastewater treatment, iv) electrodialysis (ED) for the regeneration of osmotic solutions and v) membrane distillation (MD) for the regeneration of osmotic solutions.

INREMEM studies an alternative membrane management route to the disposal in landfills once the membranes are not capable of achieving the objectives set in the water treatment processes. In this way, INREMEM will contribute to the effort of the European Union to become a "recycling society", as it is set in the Waste Framework Directive (Directive 2008/98/CE).

2.5. Ecotoxicology

2.5.1. Tools for Assessment and Planning of Aquaculture Sustainability (TAPAS)

http://tapas-h2020.eu/

Aquaculture is one of five sectors in the EU's Blue Growth Strategy, aimed at harnessing untapped potential for food production and jobs whilst focusing on environmental sustainability. The H2020 TAPAS project led by the University of Stirling (UK) and formed by 15 partners from 10 European countries addresses this challenge by supporting member states to establish a coherent and efficient regulatory framework aimed at sustainable growth. TAPAS uses a requirements analysis to evaluate existing regulatory and licensing frameworks across the EU, taking account of the range of production environments and specificities and emerging approaches such as offshore technologies, integrated multi-trophic aquaculture, and integration with other sectors. TAPAS will propose new, flexible approaches to open methods of coordination, working to unified, common standards. TAPAS will also evaluate existing tools for economic assessment of aquaculture sustainability affecting sectoral growth. TAPAS will critically evaluate the capabilities and verification level of existing ecosystem planning tools and will develop new approaches for evaluation of carrying capacities, environmental impact and future risk. TAPAS will improve existing and develop new models for far- and near-field environmental assessment providing better monitoring, observation, forecasting and early warning technologies. The innovative methodologies and components emerging from TAPAS will be integrated in an Aquaculture Sustainability Toolbox complemented by a decision support system to support the development and implementation of coastal and marine spatial planning enabling

less costly, more transparent and more efficient licensing. Within the TAPAS project, the Ecotoxicology group of the IMDEA Water Institute is particularly involved in the ecotoxicological risk assessment of potentially toxic chemicals. The main research tasks are:

- Improvement of environmental modelling tools.
- Development of appropriate environmental quality standards.
- Ecotoxicological risk assessment of chemicals in several freshwater and marine aquaculture production scenarios.

2.6. Water and Mining

2.6.1. Water and Mining Industry

Water resources are especially sensitive to mining activity, due to the intense environmental impact it causes, which in many cases includes generation of acid waters, pollution by heavy metals, modification of the hydrogeological conditions of auriferous, etc. These effects are compounded by the demand for water, especially in areas with scant resources, which often gives rise to competition with the demand from other productive sectors such as agriculture.

IMDEA Water has initiated two lines of work in the field of water and the mining industry: one in relation with the characterisation of the direct environmental impacts provoked by the mining industry, and another concerning water reuse and recycling for mining purposes.

2.7. Groundwater Ecology

2.7.1. Ecological assessment of groundwater ecosystems

Groundwater is one of the most important natural resources on Earth which is currently under an exponential increase risks due to contamination and overexploitation. Integration of knowledge resulted from groundwater ecology will significantly advance our understanding of subterranean ecosystems, in terms of improvement/maintenance of water quality, bioremediation of contaminated aquifers as well as enhancing the knowledge on groundwater habitats and biodiversity conservation. The Groundwater Ecology group of IMDEA Water is focused on applying the ecological criteria for an integrated assessment of groundwater ecosystems health, by using crustaceans as bioindicators. Our R & D activities aim to unravel the biodiversity of groundwater crustaceans and the ecological factors controlling the community's structure and function from pristine and contaminated aquifers. Current projects in the group address questions related to the impacts of agricultural practices on aquifers quality and of biotic community resilience and resistance; assess the impact of artificial recharged aquifers on groundwater ecosystems biota and the evaluation of toxic effects of emerging contaminants on groundwater crustacean species.

2.7.2. Surface / groundwater interactions – a biological and hydrological approach

The hyporheic zone is the subsurface flow area beneath and adjacent to streams and rivers characterized by active vertical and lateral exchanges of nutrients and organic matter among surface and groundwater, in response to variations in discharge and bed topography and porosity. Current projects of the Groundwater Ecology group aims to: i) assess structure and dynamics of hyporheic communities from rivers and streams in the Mediterranean and Arctic regions; ii) investigate the role of the hyporheic zone as an intermediary transfer area of pollutants from the surface rivers to groundwater; and iii) delineate the lateral and vertical spatial extents of the hyporheic zone, characterize the streambed architecture and provide detailed spatial information on vertical and horizontal continuity of hyporheic zone. We combine the biological assessments of hyporheic invertebrate's community's structural patterns and ecological features with the non-invasive geophysical techniques obtained by electrical resistivity tomography (ERT). The results of the proposed researches aims to highlight the use of hyporheic communities as an alternative proxy to investigate the water quality and surface water/ground water exchanges; to understand the hyporheic structure and function and its relation to the associated alluvial aquifers; and to provide an early warning signal of subsurface ecosystems quality decline. Our researches propose to advance our understanding of the ecohydrological processes occurring at the surface/groundwater interface and will endorse the effective incorporation of the hyporheic zone in stream management plans. Both facets are essential for the development of sustainable integrated water management strategies at the river basin level.

2.8. Cyanobacteria and Cyanotoxins

2.8.1. Smart alert against harmful cyanobacterial blooms for the water industry (CIANOALERT)

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CIANO ALERT

The objective of the CianoAlert project is to develop a real-time intelligent monitoring and alerting system to warn of the development of cyanobacteria blooms in the bodies of water destined for consumption and aquaculture facilities. The solution proposed by CianoAlert, which will allow monitoring of large areas, will combine wireless sensor network technology (sensors placed in the water) with telecommunication technologies and intelligent user interface, and the incorporation of technology controlled aircraft systems (RPAS) as remote sensing devices to obtain information relevant to the degree of affectation and the distribution and density of cyanobacteria for the implementation of a specific and sensitive system in real time, easy to handle and understand.

2.9. Climate Change

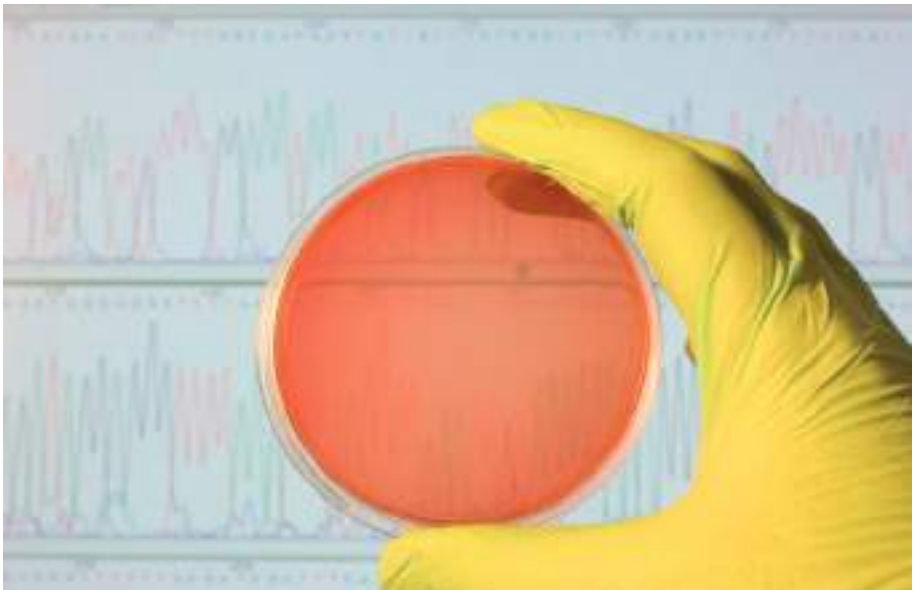
2.9.1. Towards multifunctional agricultural landscapes in Europe: Assessing and governing synergies between biodiversity and ecosystem services (TALE)

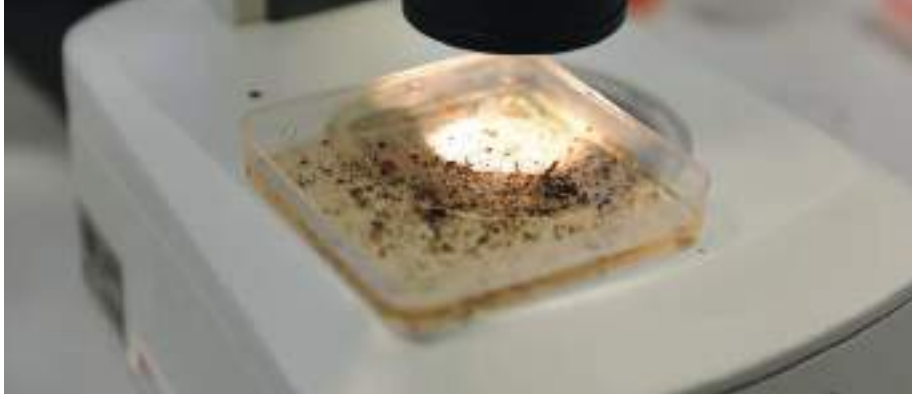
http://www.ufz.de/tale/

TALE is an interdisciplinary research project funded within the framework of BiodivERsA/FACCE-JPI (duration April 2015 - March 2018). The project supports choices at the spatial scale to be considered, strategies to decide on optimal land uses and a changing environment (e.g. climate change), the appropriate mix of policy instruments to be implemented and the required monitoring and evaluation schemes. The design is accompanied by stakeholder processes at local, regional and national level to achieve a high level of policy coherence. iMDEA Water Institute contributes to the creation of a hydrological model that can reflect as accurately as possible the performance of the water resources of the Cega, Eresma and Adaja watersheds as part of the Douro River basin. Assessing both qualities an quantity of watershed resources, it will be possible to predict different effects of water management strategies, land use and impacts that could affect water resources by the climate change effects. Contact: David Rivas.

2.9.2. Intelligent system to optimize the use of water in agriculture (SMART-HYDRO)

SMART-HYDRO aims to incorporate technological advances in sensors, multispectral images and telecommunications to control the quantity and quality of groundwater in agricultural landscape, in order to reduce energy costs, water losses and environmental impact. Within SMART-HYDRO we explore the aquifers ecosystems status affected by agricultural activities (i.e. irrigation, use of fertilizers and pesticides compounds) by analyzing the groundwater crustacean's community's structural patterns and the alterations of ecosystem services they provide related to groundwater quality.





2.10. Tool Development for Water Resource Management

There is a need to develop 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.

IMDEA Water is working on the methodological development and application of different management support tools, including remote sensing, geodatabase construction and design, and geological and hydrological modelling. Remote sensing techniques enables the location and estimation with the required precision of some important terrain features such as crop evapotranspiration, land uses, vegetation index, etc. The geodatabase records and arranges all this information, giving as result a GIS able to analyse the topological and quantitative relations of different variables. The knowledge of those variables and their relations is materialised in the implementation of a Hydrological Information System. This will allow construction of the hydrological model and will be the basis for decision-making in managing the resources.

2.11. Hydraulic Heritage

Research into water heritage aims to resolve conflicts between the existence of heritage structures and the current social need for development and growth. To this end, four main lines of action have been created:

1. Inventory and valuation of heritage systems using new technology as an integrator of different sources of data and information processing.
2. Development of valuation and territorial management support structures as useful tools for decision making.
3. Analysis of socio-economic values of water cultural heritage systems, from a sustainable strategy of traditional systems that allow their survival and constitute forms of support for endogenous economic development.
4. Assessment of heritage and traditional landscape impacts (positive and/or negative) to be integrated in a holistic manner in complex landscape systems, in which water flows are common elements.

2.12. Water Footprint

Water footprint is an index to estimate the impact of human goods and service on water bodies, whether at local, regional, national or global level. These impacts are important not only at the point of production or consumption, but also in the international context. Estimating the virtual water flows associated with the exchange of goods and services could be a useful tool for river basin water management.

To determine the virtual water flows inside the country, the Spanish Environment Ministry has approved a planning statement (Order ARM/ 2656/2008) to include a periodical water footprint analysis in river basin water management.

2.13. Water and Energy

2.13.1. Solar Photovoltaics

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

IMDEA Water is exploring the potential of integrating solar photovoltaic technologies in water treatment processes to solve the problem of safe drinking water access and/or wastewater treatment, by developing clean and sustainable solutions for both industrial and rural applications, increasing the systems efficiencies, reducing costs, saving energy, making water treatment systems accessible to communities with limited resources and infrastructures (especially in developing countries and/or rural or isolated areas in Europe with limited access), or improving water-drinking access in emergency situations. Current research lines include: a) photovoltaic-photochemical hybrid solar systems for the simultaneous production of drinking water and electricity with high efficiency; b) low cost clean water sensors for solar disinfection, measuring solar global irradiance, UV irradiance and temperature, and integrating these sensors with low-cost monitoring systems based in open-hardware; and c) water & solar energy nexus in developing countries to provide basic services and reduce environmental impact.

2.13.2. Contribution to improving the quality of life of the Saharan population through institutional strengthening of the University of Tifariti and self-management skills in health, energy and water for the population in the Saharawi refugee camps

Agencia Andaluza de Cooperación Internacional para el Desarrollo
CONSEJERÍA DE IGUALDAD Y POLÍTICAS SOCIALES

IMDEA Water cooperate with the University of Jaén in a project funded by the Andalusian Agency for International Development Cooperation (AACID) and the University of Jaén, in collaboration with the University of Tifariti. The overall objective of this project is to contribute to improving the quality of life of the Saharawi population in the refugee camps in Tindouf (Algeria) in health, water and energy. Specifically, IMDEA Water contribute to the identification and implementation of proposals for improving technical malfunc-

tion of existing infrastructures of photovoltaic solar energy, water treatment and water distribution. IMDEA Water will also participate in training tasks of responsible personnel in camps in charge of the maintenance and repair of installed photovoltaic energy and water infrastructures.

2.13.3. Open tools for technical quality in basic services: water and energy

http://www.itd.upm.es/arduino/

Develope and disseminate low-cost devices to demostrate the technical and economic viability of instrumentation for control and monitorize. Also evaluate the verification, improvement and technical quality evaluation capacities on the basic service provision in real conditions.

The ultimate aim is to dispose sensors that respond to low-cost and low maintenance requirements, however their developement falls outside the Project scope, consequently, as an intermidiate settlement, the existing commercial alternatives will be evaluated and commercial multimeasurement sensors which allow assemble the prototype and which provides a reference measure for any posible develope, will be acquired.

Contracts

- **Canal de Isabel II.** Analysis of emerging contaminants in different Drinking Water Treatment Stations (DWTS)
- **Fundación Canal.** "Study on urban water supply and sanitation in Spain"
- Framework Contract to provide services to support to Commission policy activities on the Bathing Water, Drinking Water and Urban Waste Water Treatment Directives. Water for citizens. **DG ENVIRONMENT, European Commission**
- **University of Alcala.** Evaluation of the water resources of the campus of the University of Alcalá and study of solutions for their use and integral management.
- **EUROPEAN PARLIAMENT. Multiple framework service contract in five lots for provision of external expertise on regulatory and policy issues in the fields of environmental policies, climate change, sustainable development, public health and food safety: Lot II**

  Evaluation support (through reports, studies, seminars…) of costs and benefits of actions and politics related with climate change.
- **Sadyt-Valoriza Agua.** Development of innovative technology for tertiary wastewater treatment based on land application systems.

- Framework Contract to provide services to support the development and implementation of EU Freshwater Policies **DG ENVIRONMENT, European Commission:**
  - Maximising Water Reuse in the EU
- The 2030 Water Resources Group (2030 WRG) **(IFC, World Bank Group)-WEF (World Economic Forum)** (Framework Contract 7172014):
  - Hydro-Economic Analysis of Water Demand Reduction & Water Supply Augmentation - Identifying cost-effective solutions in Mongolia (Brown Coal Regions of Nyalga Shivee-Ovoo and Tavan Tolgoi, and Ulaanbaatar).

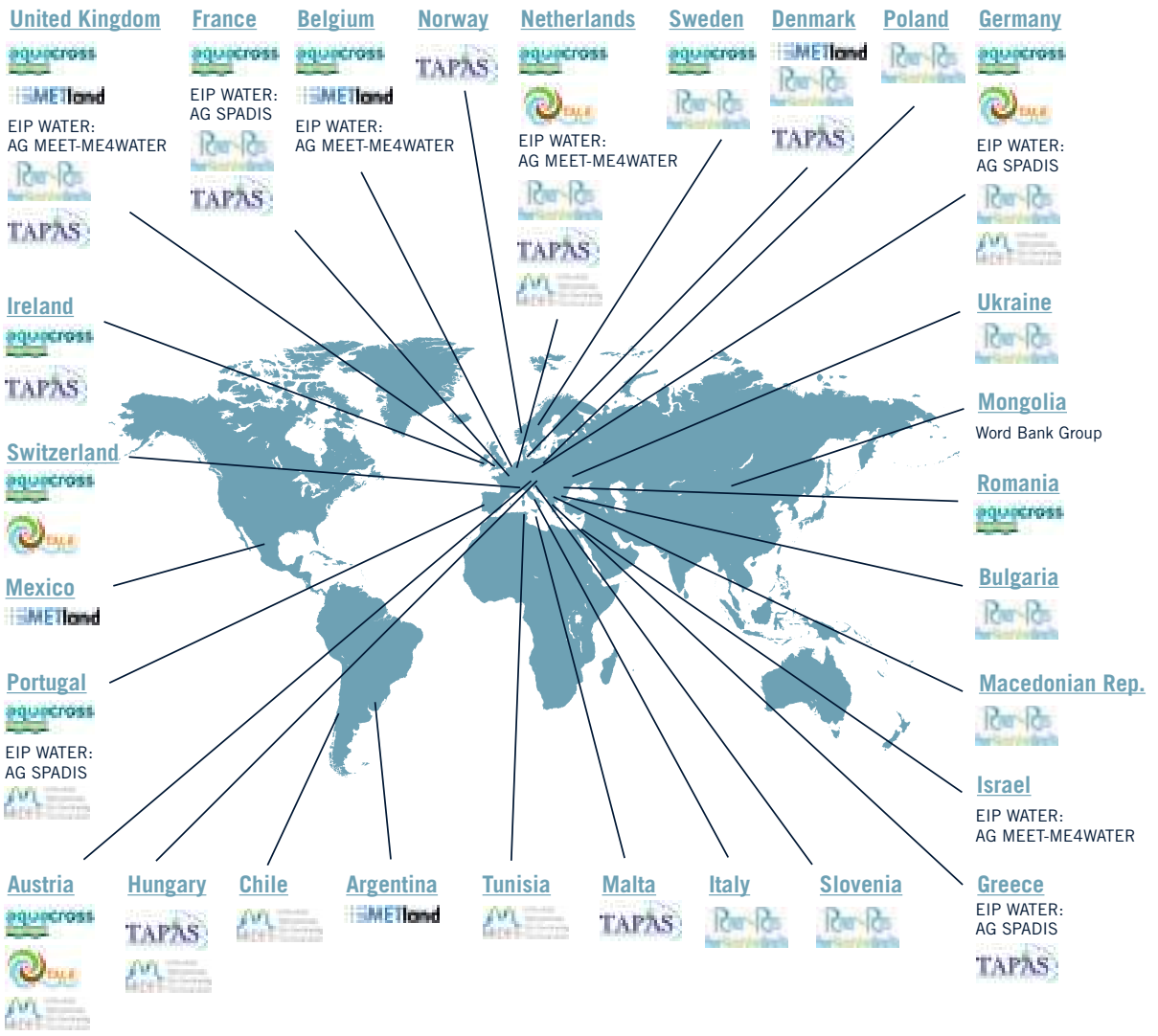


Figure 2. Countries collaborating in projects and contracts

human resources

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- 3.1.1. Water, chemistry and membranes [29]
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3.3. **Management Area and Administration [49]**

annual report 2016

research groups
water, chemistry and membranes

Dr. Eloy García Calvo
Director

He received his Ph.D. in Industrial Chemistry from the Complutense University of Madrid in 1980. Since 1992 he is professor of Chemical Engineering at the University of Alcalá (UAH). He directs a project of the first call Consolider-Ingenio 2010, www.consolider-tragua.com, involving 180 researchers from 24 research groups in Spain. He also coordinates the CNR COP (National Reference Centre for Persistent Organic Pollutants) www.cnrcop.es, MARM Ministry and collaboration between INIA and UAH. As a researcher in the areas of biotechnology and, especially, environment he has led 17 research projects at European, national and regional level. He has also been responsible of 10 projects in collaboration with companies and private funding. Other results include 5 patents, and about a hundred of scientific papers, mostly in the most relevant journals in the area, and 10 PhD directed.

Currently, he is the research coordinator of the project LIFE TRANSFOMEM, and he also coordinates two spanish projects: INREMEM and TRAGUANET Network. He has been part of the evaluation panel of Environmental and Climate Programme in the 3FP and 4FP of the EU, the International Geosphere-Biosphere Programme (ICSU), Expert Panel on Technology and Technology Transfer at the UN and the Working Party on Biotechnology-Electronic Discussion Group of the OECD on the issue of safe drinking water. He has previously been Vice Chancellor for Research at the UAH, Manager of RTD Environmental programme within the National RTD, a member of the CNEAI (National Evaluation of Research Activity) (board nº6 of architecture and engineering), Coordinator of Technology Programme for the Environment of the Madrid Region and evaluator of scientific projects in the European Union, Hungary, Argentina and Spain (Galicia, Aragon, Basque Country). He has also published opinion articles in environmental and science newspapers.

Among the awards, special mention of the UAH, 2007, in transfer of knowledge and the Prize of the IWA (International Water Association) in the category of "Sustainability: practical implementation" received during world congress of the association held in November 2010 in Montreal.

Furthermore, during the Science Gala 2012, Consolider Tragua was acknowledged by the Directorate General of Technical and Scientific Research as one of the five projects that represent the quality of the Spanish science and that have been recently funded by the Spanish National Research Plan.

Dr. Pedro León García
Associated Researcher

Graduated in Chemistry in 1985 from University of Alcalá, with a Ph.D. in Chemistry from the Engineering Department of Alcalá University in 1992. Professor at the University of Alcalá, he is co-author of more than thirty papers in international peer-reviewed journals, and several technical reports for industry.

Nowadays he works on wastewater treatment focused on degradation of xenobiotic compounds by chemical (ozone) or biological (aerobic and anaerobic) processes. Xenobiotics of interest are pharmaceutical and personal care products detected in wastewater plant effluent which must be removed in order to reuse the water.

Toxicity aspects such as synergisms and antagonisms in mixtures between compounds and metabolites, as well as their evolution during treatment, are also of interest.

Dr. Roberto Rosal García

Associated Researcher

Roberto Rosal received Master degrees with honours in Chemistry and in Business Administration and a Ph.D. degree in Chemistry from the University of Oviedo with distinguished dissertation award. Professor of Chemical Engineering at the Department of Chemical and Environmental Engineering of the University of Oviedo from 1992 to 2003 and currently at the Department of Analytical Chemistry and Chemical Engineering of the University of Alcalá and associated researcher at the Advanced Study Institute of Madrid (IMDEA Agua). His recent scientific interests are focused on water treatment with emphasis on aqueous micropollutants and the processes for their removal. This includes the development of methods for assessing the toxicity of emerging pollutants comprising engineered nanoparticles and their mixtures. He is also working on the bio-nano interaction of engineered materials and the production of fouling resistant membranes, particularly nanofibrous electrospun materials. He participated in more than thirty financed research projects and R&D contracts and published over eighty scientific articles and book chapters. He is currently leading several projects with national and international funding.

Dr. José Antonio Perdigón Melón

Associated Researcher

PhD in Chemistry from the University of Alcalá. Associate Professor at the University of Alcalá since 2011, assigned to the area of Chemical Engineering. He has taught Chemistry and Environmental Engineering at various degrees and Master. Author of over 30 articles based on synthesis and characterization of catalysts and wastewater treatment, he has participated in over 18 projects of national and international research. He has directed more than 10 undergraduate, graduate and Master Thesis projects. The research developed in recent years have focused on the treatment processes of wastewater and associated toxicity, and the study of water conditioning processes (fit-to-use) both by processes of ozonation and electrooxidation.

Dr. Mohamed Khayet Souhaimi

Associated Researcher

PhD in Physics. He is an expert on membrane science and technology (membrane design and fabrication, membrane processes including nanofiltration, emerging technologies) and water treatment (desalination, wastewater treatment, etc.). He has contributed a substantial number of articles (over 120 papers since 2000) on the subject of membrane science and technology to various international refereed journals, including among others, Journal of Membrane Science and Desalination. He has filed 5 International Patents on the fabrication of polymeric membranes for water treatment. Recently, he has published 3 books: “Membrane Distillation: Principles and Applications”, Elsevier (2011)”, “Membrane Modification: Technology and Applications”, CRC Press, Taylor & Francis Group (2012) and “Pervaporation, Vapour Permeation and Membrane Distillation”, Elsevier (Woodhead Publishing Ltd) (2015); and edited 5 special issues in international journals. He has coordinated various national and international projects funded by different institutions (European Union, Spanish Ministry of External Affaires, Spanish Ministry of Science and Innovation, Middle East Desalination Research Center (MEDRC), Abengoa Water, etc.).

He has supervised several research studies (9 Ph.D. thesis, 25 master thesis and undergraduate students). He is currently member of the European Desalination Society (EDS), the European Membrane Society (EMS) and the North American Membrane Society (NAMS). He has delivered over 60 oral presentations at national and international conferences on membranes and membrane processes and presented more than 45 posters. He is actually associate editor of the journals “Desalination” and “Water and Desalination Research Journal”, and member of the editorial board of the Journals: “Applied Membrane Science & Technology”, “Membrane Water Treatment (MWT)”, “Membranes”, “Polymers”, “Applied Sciences”, “Journal of Materials Science and Nanotechnology”, “SAJ Nanoscience and Nanotechnology” and “Journal of Membrane Science and Research”. He has recently received the prestigious “Prince Sultan Bin Abdulaziz International Prize for Water” (PSIPW, 5th edition, 2012) on Alternative Water Resources (Saudi Arabia) for his novel and creative work in membrane distillation (MD) technology that he has studied and promoted in all its theoretical and experimental aspects (from membrane synthesis to implementation).

Dr. Leonor Nozal Martínez

Quality and Laboratories Management

She obtained her PhD on Chemical Sciences by the University of Córdoba. Her doctoral thesis, supervised by Profs. Arce L, Ríos A and Valcárcel M, was presented in February 2006. Her thesis was focused in the development of new strategies and tools for enhancing sensitivity and selectivity in capillary electrophoresis-mass (CE-MS). The use of membranes and hollow fibers in the design of new alternatives for sample treatment is an example of her work.

During a year (2006-2007), she was working in quality control in the multinational company KME-LOCSA in Córdoba. She continued her career as a researcher, and in May 2007, she joined as head of area of Analysis and Control in the center of applied chemistry and biotechnology (CQAB) of the University of Alcalá. Her main research line is the development of projects and new analytical methods in different fields, such as drugs, environmental additives, natural products, foods, organic contaminants, cosmetics, etc., using analytical techniques of liquid chromatography coupled to mass spectrometry (LC-MS/MS). She is also responsible for analytical support for structure determination and control of purity and quality of new products generated in the synthesis.

She has participated to date in 25 R&D projects funded by governments or public entities and private companies. She has over 20 scientific publications, some in the most important journals in the field. She has presented several research papers, both in poster and oral presentations at numerous national and international conferences. Since 2010 she is member (vocal) of 2 committees in AENOR.

Dr. Alice Luminita Petre

Associated Researcher

She received a BSc in Chemistry and a MSc in Physical Chemistry and Applied Radiochemistry from the University of Bucharest (Romania) and a PhD with European PhD Mention in Catalysis from the Université Claude Bernard Lyon I (France) under the supervision of Dr. Aline Auroux (France) and Dr. Niculae I. Ionescu (Romania). The PhD work involves the synthesis, the bulk/superficial characterization and the catalytic properties for selective catalytic reduction of NOx of supported gallium oxide catalysts. She received the "I. G. Murgulescu" National Award in Physical Chemistry of the Romanian Academy in 2001. PhD fellowships in Institut de Recherches sur la Catalyse, Villeurbanne (France) and postdoctoral stays at the RWTH Aachen (Germany) under the supervision of Prof. Wolfgang Hoelderich and the Institute of Catalysis and Petrochemistry (CSIC, Madrid).

Since 2007 she was a researcher from the National Science Program Ramón y Cajal in the Department of Analytical Chemistry and Chemical Engineering of the University of Alcalá, Madrid. Associate Professor University of Alcalá since 2012 assigned to the area of Chemical Engineering.

She has taught Environmental Engineering graduate and undergraduate courses and directed over 15 research dissertations.

She has participated in more than twenty financed research projects and R&D contracts and she has published over thirty five articles in peer-reviewed journals. Main research interests lie in the area of the synthesis of new materials and catalysts, advanced oxidation processes, cytotoxicity and aquatic toxicity of emerging and priority pollutants, oxidation intermediates and complex mixtures of toxicants.

Dr. Serena Molina Martínez

Researcher

She obtained her PhD by the Complutense University of Madrid. Her doctoral thesis, supervised by Prof. Javier de Abajo and Prof. José G. de la Campa, was presented in November 2012: "Preparation of porous membranes from hydrophilic aromatic polyamides. Evaluation as membranes for ultrafiltration and pervaporation operations". Her knowledge about material science has been complemented with the Master Degree in Advanced Specialization in Plastics and Rubber at Menéndez Pelayo International University (UIMP) and Spanish National Research Council (CSIC), with the Project: "Applications of polymers in the preparation and use of membranes for brackish water distillation".

During 4 years she has worked at Institute of Polymer Science and Technology (ICTP-CSIC) and she has participated in 5 research projects on the development and testing of polymeric membranes for different water treatment operations: Ultrafiltration, Reverse and Direct Osmosis, Membrane Distillation.

She has taught laboratory practices in the Master of Advanced Specialization in Plastics and Rubber. She has presented 17 communications at several national and international conferences. She has published 12 articles in indexed journals, a patent and a book chapter.

She joined IMDEA Water in July 2014. Currently, she is involved in different projects carrying out the evaluation, modification and (spectroscopic and morphological) characterization of reverse osmosis, nanofiltration and ultrafiltration membranes.

Dr. Junkal Landaburu Aguirre

Researcher

Dr. Junkal Landaburu Aguirre obtained the degree of M.Sc (Chemistry) in 2004 from the University of Basque Country, Spain. She started her PhD studies in 2006 in the Environmental and Chemical Engineering group of the University of Oulu, Finland, from where she got her doctoral degree in 2012. Her PhD thesis was focused on the removal of heavy metals from phosphorous rich wastewaters using membrane technology (Micellar-Enhanced Ultrafiltration). After defending her thesis she continued working at the University of Oulu as a postdoctoral researcher. During this period, she made a one year research stay (2014/01/01-2014)/12/31 in the Chemical and Environmental Engineering group of the University Rey Juan Carlos, Spain, where she focused on the preparation of thin film composite membranes with nanoparticles.

She has worked in diverse projects related to industrial wastewater treatment. She has 16 scientific articles published in international scientific journals and 18 communications in international conferences, from which 7 were given as oral presentations.

She joined IMDEA Water in January 2015 with a Marie Skłodowska-Curie AMAROUT fellowship.

Dr. Julio José Lado Garrido

Associated Researcher

He obtained his PhD on Hydrology and Water Resources Management by the University of Alcalá in May, 2014. His doctoral thesis was "Study of asymmetric capacitive deionization cells for water treatment applications". Master's degree in Hydrology and Water Resources at Alcalá University and Rey Juan Carlos University (Madrid, 2007-2008). Bachelor of Science in Chemistry Degree at Alcalá University (Madrid, 2000-2007). Technological Watch Technician in OTRI-UAH (Office of Research Results Transfer, Madrid, 2008). Laboratory Technician, experience with HPLC and GC in CAL (Chemisch Analitysches Laboratorium) (Darmstadt, Germany, 2007). Environmental technicial in IDOM Ingenieros (Madrid, 2006). Research Master Project, "PPCPs, Source, Treatment, Monitoring and Impact" (Madrid, Mayo 2008). Research Project, "Synthesis of Indenyl-dialkil- phosphines" (Eduard-Zintl-Institut für Anorganische und Physikalische Chemie, TU Darmstadt, Germany, 2006). Ecocampus Research Project "Pesticide residues in mediterranean diet" (UAH, Madrid 2005).

Raquel García Pacheco

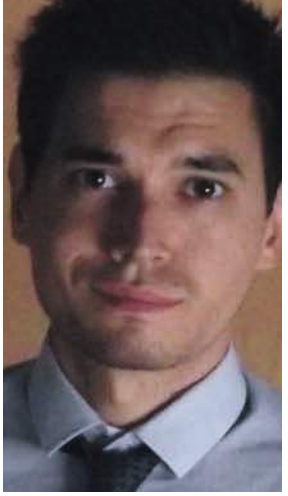
Predoctoral Researcher

Degree in Chemical Engineering from Rey Juan Carlos University. Madrid. Spain.
MSc in Hidrology and Water Resources Management at Alcalá University, Madrid. Spain.
Research: European project LIFE13 ENV/ES/000751 TRANSFOMEM (Transformation of disposed reverse osmosis membranes into recycled ultrafiltration and nanofiltration membranes).

Laura Rodríguez Saez

Researcher Support

Degree in Environmental Sciences from Autonoma University of Madrid
MSc in Environmental Management, Quality and Audit
Research: European project LIFE13 ENV/ES/000751 TRANSFOMEM (Transformation of disposed reverse osmosis membranes into recycled ultrafiltration and nanofiltration membranes).



Francisco Javier Rabadán Martínez

Researcher Support

Degree in Chemical Engineering from the Murcia University and in Industrial Engineering at Polytechnic University of Cartagena
Research: European Project LIFE13 ENV/ES/000751 TRANSFOMEM (Transformation of disposed reverse osmosis membranes into recycled ultra- and nanofiltration membranes).

Amaia Ortiz de Lejarazu Larrañaga

Researcher Support

Degree in Environmental Sciences from the University of the Basque Country
Research: Membrane technology.

water reuse

Dr. Irene de Bustamante Gutiérrez

Deputy Director

Ph.D. in Geological Sciences from the Complutense University of Madrid.

Since 1990 is Professor in the Department of Geology at the University of Alcalá. She is currently Director of the Master's Degree in Hydrology and Water Resource Management.

Since 2007 she is the Deputy Director of IMDEA Water Institute. Among her current research may include: hydrogeology, water quality and pollution, reuse of reclaimed water for irrigation and aquiefers recharge and environmental cartography.

She has participated in 60 projects and research contracts, in 35 of them being the principal investigator. The results are reflected in more than 200 papers in journals, books and papers, two patents (one licensed) and a software.

She has also directed 8 doctoral theses, licentiate 4 PhD and 35 master's projects.

Also noteworthy is her work as Director of the Master in Hydrology and Water Resources Management, besides being part of the Educational Commission of the PhD in Hydrology and Water Resources Management.

She recently won several research awards, 3 of them related to Consolider Tragua "Treatment and reuse of wastewater for sustainable management", granted by the Board of the University of Alcalá in 2007; by the International Water Association in 2012 within of the category "Grand prize in the practical realization" and by the Directorate General of Technical and Scientific Research in 2012 as one of five representative projects funded scientific quality recently by the Spanish National Research Plan. She also won a second prize in 2012 during the XIV edition of the 3M Foundation Awards for innovation for her work "Evolution of traces of drugs in the treatment of urban waste water."

Dr. Francisco Javier Lillo Ramos

Associated Researcher

He graduated in Geology in 1985 from the University Complutense of Madrid and got the Diploma in Geological Engineering in 1985. He obtained a Ph.D in Earth Sciences from the University of Leeds (Britain). Afterwards, he spent ten years working in the industry, mainly as field geologist. In 1999, he joined the academic staff of the University Rey Juan Carlos, where is teaching geology and hydrology and is the Head of the Group of Geology since then. He obtained the academic tenure in 2003. Dr. Lillo is the co-director of the Master of Hydrology and Water Resources Management (University of Alcalá-URJC) since 2005. He has published over 60 research papers, including 47 articles in peer-reviewed journals and 6 books and metodologic guides. He has been participant in 22 research projects (Spain, Chile and European Union), in 8 of them being the principal investigator. Dr. Lillo has also collaborated in several projects with industry. His research is currently focused on studies about regeneration and water quality; hydrochemical characterisation of groundwater and surface water: environmental impacts assessment of mining in air, soils and water and studies of abiotic environment in ante glacier ecosystem.

Dr. Francisco Carreño Conde

Associated Researcher

Graduated in Geological Sciences from the Complutense University of Madrid and obtained a Ph.D. for the Rey Juan Carlos University. He worked for four years in a private sector environmental company and three years on a research grant in remote sensing (Complutense University of Madrid).

He has been Professor of Biology and Geology Department at Rey Juan Carlos University since 2002. He is a co-author of six papers in international peer-reviewed journals, one scientific book and four chapters of scientific books, and more than 40 marine geology and geomorphology maps. His research is currently focused on remote sensing and GIS techniques applied to prospecting, management and conservation of water, geology, detection of submarine groundwater discharges. He has also experience in 3D geological surfaces for groundwater modelling.

Dr. Raffaella Meffe

Researcher

Graduated in Geological Science with specialization in hydrogeology at the University of Rome "La Sapienza" in 2007. During her master thesis, she carried out the characterization of a carbonatic aquifer to quantify the natural groundwater resource for a suitable drinking water management.

She obtained her PhD at the Free University of Berlin in 2011. The PhD research was mainly focused on organic contamination of groundwater used for drinking water production.

She published papers in international peer-reviewed journals and attended international conferences.

Dr. María del Carmen Cabrera Santana

Associated Researcher

Ph.D. in Geology from the University of Salamanca. She has developed his professional work in the Geological and Mining Institute of Spain, in the Hydraulic Service in Las Palmas (Directorate General of Water. Canary Islands Government) and the University of Las Palmas de Gran Canaria, as Professor since 2003. Her research focuses mainly in the field of Hydrogeology of volcanic terrains, but she has also conducted studies on the stratigraphy and sedimentology of the Las Palmas detritic Formation. She is the author of numerous national and international publications.

Dr. María del Pino Palacios Díaz

Associated Researcher

PhD in Agricultural Engineering (1993), Polytechnic University of Valencia. Additionally, she holds a Master's Degree in Environmental Engineering by the University of Las Palmas de Gran Canaria (ULPGC). She is an expert in Techniques for Agricultural Business Management and a Specialist in Pruning. Since 1999, she is Professor in the ULPGC. Her current research lines, among others, are: agricultural reuse of reclaimed water from municipal origin; water monitoring, optimization of its management and of agronomic and health issues involved in its reuse; soil and subscriber; production of forage and biofuels; maintenance of irrigation systems; water quality (studies on the presence and movement of emerging contaminants in soil and water). She has participated in 15 research projects (in 9 of them as principal investigator) and 9 research contracts. She has 30 papers in journals and books, and in 63 International and National Conferences monographs. She has also published several dissemination articles, receiving the Canary Islands Award to the best dissemination work. She has conducted one PhD thesis.

Dr. Lucila Candela

Associated Researcher

PhD in Groundwater hydrology. Specialist in water resources, groundwater and groundwater pollution. She has participated in more than 50 national and international research projects as PI (EU, UNESCO, National level, private). She is co-author of 230 publications including several books as author an editor. Within her expertise she has being R&TD Manager of ERANET's Programmes-Ministry of Science and Innovation-Spain; R&TD Manager of Water Resources Programme-Ministry of Education Spain; Seconded Expert at Division of Water Sciences-International Hydrological Programme - UNESCO-Paris. She has participated as expert in International Pannels: EU-External Advisory Group for Water and coastal areas; GEF-UNEP/MAP Strategic partnership for the Mediterranean sea large Marine ecosystem (Medpartnership); Edinburgh Research Partnership's, Advisory group member, University of Edimburg; Ministere de l'Ecologie, France. Member of Water Resources Projects, Paris; GRAPHIC/UNESCO Programme. Committee Member.

Dr. María de las Virtudes Martínez Hernández

Researcher

PhD in Hydrology and Water Resources Management at University of Alcala (2015), MSc in the same programme (2008) and BSc in Environmental Sciences at University of Alcala (2007). During her career she has worked with environmental contamination problems and water quality. Her research is mainly focused on contaminant reactive transport through porous media, environmental water reuse, and water resources management and quality. She deals particularly with emerging contaminants such as pharmaceuticals, and their natural attenuation during infiltration. In addition, she collaborates with the master programme "Hydrology and Water Resources Management". She also participates in scientific dissemination events such as Week of Science and European Researcher's night.

Dr. María Leal Meca

Associated Researcher

PhD in Hydrology and Water Resources Management at Rey Juan Carlos University (June 2015). BSc in Environmental Sciences at the same university and MSc in the Hydrology and Water Resources Management by University of Alcalá and University Rey Juan Carlos. She works in research projects related to the quality and pollution of groundwater bodies, with reactive transport modelling and with water reuse with environmental purposes (biomass irrigation and groundwater recharge activities). In particular she studies the interaction phenomena between nutrients and organic microcontaminants with different solid phases such as soils, clays, activated carbon, etc. She also collaborates in scientific dissemination activities such as the European Researcher's night. Currently she is a visiting professor at University Rey Juan Carlos.

Alberto Blanco González
Associated Predoctoral Researcher

Degree in Environmental Sciences from Alcalá University, Madrid. Spain.
MSc in Hidrology and Water Resources at Alcalá University and Rey Juan Carlos University. Madrid, Spain.
Research: Methodology for the inventory of Hydrosites and their application in the Biosphere Reserve of the Sierra de Béjar y Francia (Salamanca)

Adrián Pérez Barbón
Research Support

Degree in Mining Engineering at University of Oviedo.
Research: Hidrogeology.

David Mostaza Colado
Research Support

Degree in Environmental Sciences at University Rey Juan Carlos.
MSc in Hydrology and Water Resources Management at University of Alcalá & University Rey Juan Carlos.
Research: Intelligent system to optimize the use of water in agriculture.

David Andrés Rivas Tabares
Research Support

Degree in Agricultural Engineering (UNAL) from National University of Colombia.
MSc in Hydrology and Water Resources Management by (Universidad de Alcalá & Universidad Rey Juan Carlos, 2014-2015)
Research: Hydrological modeling

water biology and bioelectrogenesis

Prof. Marco Vighi

Researcher

Marco Vighi tooks the degree in Biology at the University of Milano, in 1969. He operated in the field of environmental pollution since 1969, working at the Water Research Institute of the National Research Council in Italy. In 1983 he got a chair at the University of Milano where he was professor of Agricultural Ecotoxicology. In 1998, he moved to the Department of Earth and Environmental Sciences of the University of Milano-Bicocca, where he was professor of Ecology and Applied Ecology and responsible of the Research Group on Ecotoxicology up to November 2015, when he retired.

Up to the early 1980s, his scientific activity was mainly addressed to applied hydrobiology and eutrophication of marine and fresh waters. In the last three decades, the research activity moved toward ecotoxicology. Main research fields are: ecotoxicology of organic pollutants on aquatic and terrestrial ecosystems at different levels of organization; Quantitative Structure-Activity Relationships (QSAR); distribution and fate of contaminants (monitoring and modeling); long range transport of persistent organic pollutants; effects and environmental fate of complex mixtures; environmental risk assessment; bridging ecotoxicology with environmental economy. He published more than 160 scientific papers and books on applied ecology and ecotoxicology.

From 1991 to 2013 Marco was member of Scientific Advisory Committees on Toxicology and Ecotoxicology of the European Commission, DG SANCO (CSTE, CSTEE, SCHER). Since April 2016 he is member of Scientific Committee on Health, Environmental and Emerging Risk (SCHEER) of the European Commission. In several occasions he was consultant on environmental issues for the FAO/UNEP, for the World Health Organisation and for the UNEP/POPRC (Persistent Organic Pollutants Review Committee) on issues related to the Stockholm Convention. From 2002 to 2005 he was Senior Consultant of the Project "Phase-out of pesticidal POPs in China", developed by the UNPD (United Nations Development Programme) in collaboration with the Chinese government, with the aim of the implemetation of the Stockholm Convention in China.

Marco is incorporated at IMDEA Water since December 2015 with the objective of developing a new research line on Aquatic Ecotoxicology and Ecological Risk Assessment.

Dr. Abraham Esteve Núñez

Associated Researcher

Principal investigator of the Bioe Group, he develops his work in the field of environmental biotechnology, specifically in Microbial Electrochemical Technologies (MET), and its application, among others, to wastewater treatment.

Graduated in Biochemistry from the University of Murcia (1995), he carried out his doctoral research on the microbial biodegradation of explosives at the Zaidín Experimental Station (CSIC) and obtained a PhD in Biochemistry from the University of Granada with an Extraordinary Prize (2000). He completed postdoctoral studies at the Environmental Biotechnology Center of the University of Massachusetts (USA) from 2001 to 2005, and at the Astrobiology Center (INTA / CSIC, Madrid) from 2005 to 2008.

In 2009 he joined the Universidad de Alcalá as a researcher hired through the Ramón y Cajal programme. In 2013 he obtained his position as Associate Professor in the area of Chemical Engineering. He lectures in various degree courses as well as in the Master of Hydrology and Management of Water Resources of the UAH. To date, he has conducted five doctoral theses, more than 12 master's degrees and has been a member of some 20 national and international theses committees.

He is the author of 40 scientific publications and 7 national and international patents, one of them a PCT awarded by Madrid + d (2015). He has participated and coordinated diverse national and European projects, among them iMETland (awarded by Madrid + d in 2016) and MIDES, both of Horizonte2020 programme. Secretary of the European section of ISMET (International Society for Microbial Electrochemistry and Technology), in 2013 he was editor of ISMET news, the society's quarterly newsletter. In addition, he was responsible for EU-ISMET 2014, the European Congress.

Since 2014 he has been responsible for MEET-ME4WATER, an action group in the EIP Water.

He is also coordinator of IBERIMET, the National Network of Microbial Electrochemical Technologies, which gathers the main Spanish groups in the field.

In 2016 he received the First Prize of the Campus of International Excellence 'Intelligent Energy' for the work *Electrosynthesis of bio-products of high added value and bioenergy from wastewater through mixed cultures of photobacteria illuminated with infrared light.*

Dr. Rehab El-Shehawy

Researcher

She has obtained her PhD. degree in Microbiology from the University of Bayreuth Germany in 2001. She authored and co-authored more than twenty one articles. She collaborates and welcomes collaboration on both national and international levels.

Working at the interface between research and product development, Dr. El-Shehawy is currently leading the group of Cyanobacteria and Cyanotoxins dedicated to offer technology-based solutions to tackle the problems caused by over-growth (blooms) of cyanobacteria in water bodies and their toxins.

Dr. Sanda Iepure

Researcher

Graduated in Biology from Babes-Bolyai University in Cluj Romania, she received her PhD degree in Biology from the Romanian Academy in 2008. She has developed research in groundwater ecology and cave fauna working in Romania at the Institute of Speleology "Emil Racovita", Cluj (Romania) since 1999. During her research carrier she spent several months in the Groundwater Ecology Department at the Institute for Limnology Mondsee (Austria) and Nationals Museums of Natural History from Madrid, Bruxelles, Paris and Warsaw.

Her general interest is groundwater ecology and risk assessment; ecology and biogeography of subterranean crustaceans; and the study of evolutionary mechanisms and speciation processes in groundwater crustacean populations by using traditional approaches of classical morphology and geometric morphometry (on recent and fossils ostracods). Currently her research lines is focused on the assessment of subsurface ecological status in transitional hyporheic zone of rivers and aquifers in detrital and soluble carbonate rocks by using the groundwater crustaceans as indicators.

Dr. Iepure has authored and co-authored twenty six scientific articles of which ten are published in per-reviewed international journal and nine are book chapters.

She has been conducted and participated in several groundwater research projects financed by the National University Research Council (NURC) in Romania.

Dr. Karina Boltes Espínola

Associated Researcher

Chemical Engineering. PhD in Chemistry from the University of Alcala in 2000. Assistant Professor in Chemical Engineering Department. Her research is focused on optimisation of biological processes for degradation of xenobiotics using reactors of different configurations. Toxicological evaluation of mixed pollutants in wastewater and biostimulation of microorganisms for in-situ biodegradation are other research areas. She has participated in 20 research projects sponsored by the Spanish government and private enterprises. She has also been the director of 3 PhD thesis, and many post-graduate research projects in the Master on Hydrology and Water Management from the University of Alcala.

Dr. Alessandro A. Carmona Martínez

Researcher

He has a degree on B.Sc. Environmental Engineering from the National Polytechnic Institute of Mexico (2001-2005). His thesis was entitled: "Batch bio-H2 production with inhibited methanogenic consortia from organic solid waste".

Later he obtained a M.Sc. degree on Environmental Biotechnology (2005-2008) at CINVESTAV-IPN, Mexico during which he worked on the topic "Electricity production in microbial fuel cells fed with spent organic extracts from hydrogenogenic fermentation of organic solid wastes".

From 2008 to 2012 he moved to Germany to do a Ph.D. (magna cum laude) at TU Braunschweig. There he conducted research on "Electron transfer mechanisms in electrochemically active microbial biofilms".

In 2012 he spent 3 months at the VU Amsterdam, The Netherlands as a scientific visitor where he studied "Outer membrane cytochromes of microbial biofilms by a combination of surface-enhanced resonance Raman scattering spectroscopy and electrochemistry".

From 2012 to 2015 he moved to France where he worked as Postdoctoral Researcher at INRA-Narbonne. There he worked mainly on three topics: (i) "Coupling H2 production by dark fermentation and microbial electrolysis", (ii) "Electron transfer mechanisms of novel electrochemically active bacteria" and (iii) "Microbial electrosynthesis of acetate".

Dr. Antonio Berná Galiano

Researcher

Dr. Antonio Berná Galiano obtained a degree in Chemical Engineering from the University of Alicante in 2000. In this university, he achieved a PhD in Materials Science (2014), specialized in spectroelectrochemical studies for characterization of interfacial processes such as the specific adsorption of anions.
In 2007, he began to apply spectroelectrochemical techniques to the study of the bacteria/electrode interaction and the involved charge transfer processes (Angew. Chem. Int. Ed. 47 (2008) 4874-4877).
Since 2010 until March 2015, he was a contracted as researcher at the Department of Analytical Chemistry, Physical Chemistry and Chemical Engineering in the University of Alcalá. Currently, as researcher at IMDEA Water, Dr. Berná has focused its research on the study of the electrochemical engineering aspects for the application of the microbial Bioelectrogenesis in such a fields as wastewater treatment.

Dr. Juan Manuel Ortiz Díaz-Guerra

Researcher

Chemical Engineer (2002) and PhD on Electrochemistry (2009) at University of Alicante, Spain ("Program: Electrochemistry: Science & Technology"). His thesis was entitled "Desalination of brackish water by electrodialysis powered directly by solar photovoltaic energy: feasibility study and modelling" (Supervisors: Prof. Antonio Aldaz Riera and Prof. Vicente Montiel Leguey).

Researcher of "Applied Electrochemistry and Electrocatalysis" Group, University Institute of Electrochemistry, University of Alicante (Spain), during the period 2002-2012, being his interests the electrochemical processes for environmental protection, waste water treatment using electrochemical technology, energy production an storage, microbial electrochemistry (microbial fuel cells), and electrochemical systems powered by renewable energy.

From 2010 to 2012, he was involved as researcher in BacWire Project (project co-financed by the Seventh Framework Programme of the European Union), developing a new concept of microbial fuel cell using nanomaterials and functionalized electrodes (www.bacwire.eu).

From 2013, his scientific research is focused on development of waste water treatment processes using microbial electrochemical technology, formerly in FCC Aqualia S.A. as "Project Manager" at Innovation and Technology Department, and currently at Environmental Biotechnology Research Group of IMDEA Water (Principal Investigator: Abraham Esteve-Nuñez). He is author of various scientific papers and more than 20 communications in international conferences and workshops, and co-author of 2 patents related to water technologies.

Among his professional and scientific interests: Bioelectrochemical Engineering, Water technology, Desalination systems, New developments based on membrane technology and electrochemical concepts, and low-energy technologies for water treatment and production of drinking water.

Dr. Sara Tejedor Sanz

Researcher

Degree in Chemical Engineering at the Complutense University of Madrid and Master in Hydrology and Water Resources Management at the UAH/URJ. Last year studied at the Technical University of Denmark (DTU, Copenhagen) and 6-month internship the Department of Environmental Engineering in the area of bioenergy. In the last 5 years she has worked as a researcher at IMDEA Water, FCC Aqualia and the University of Alcalá, being linked to projects of public-private partnerships related to microbial electrochemical technologies as Aquaelectra, ITHACA, BioSO4 and EM4EM.
She currently works for IMDEA Water as predoctoral researcher in collaboration with the group Bioelectrogénesis of Dr. Abraham Esteve Núñez in the line of wastewater treatment by microbial electrogenesis.

Dr. Andreu Rico Artero

Researcher

Andreu Rico holds a BSc in Agricultural Engineering (graduated with honours) and a high-education degree (Licenciatura) on Environmental Sciences from the Polytechnic University of Valencia, Spain. In 2009, he obtained his MSc on Aquatic Ecology and Water Quality Management from Wageningen University, the Netherlands. During his master studies he focused on assessing the fate and toxicological effects of pesticides in tropical freshwater ecosystems and collaborated with two international projects, in Brazil and Costa Rica. In May 2014, Andreu Rico obtained his PhD on Ecotoxicology and Chemical Risk Assessment from Wageningen University. As part of his PhD he investigated the environmental risks posed by the use of veterinary medicines in Asian aquaculture. After his PhD he worked for a year and a half in Alterra (the Netherlands), where he specialized on the ecological risk assessment of pesticides and other emerging contaminants (pharmaceuticals, home-care products). Andreu Rico has participated in 6 international projects and has a strong background on the design of experiments and predictive models for the ecological risk assessment of contaminants. He is an active member of the Society of Environmental Toxicology and Chemistry and is co-author of more than 20 papers, 30 conference proceedings and a large number of reports for the EU and the chemical industry. During the last few years he has participated in the supervision of master students and in the ´Chemical Stress Ecology and Risk Assessment´ course of Wageningen University.

Andreu Rico joined the IMDEA Water Institute in December 2015, under the framework of the Marie Skłodowska-Curie AMAROUT program. His main objective is to develop a new research line on aquatic ecotoxicology and ecological risk assessment. One of his main interests is to identify key stress factors that affect aquatic populations and communities under Mediterranean conditions, as well as to evaluate their interactive effects with urban, agricultural and industrial pollution. His investigations aim to develop new modeling tools that are able to integrate the multiple stress factors related to global climate change into a more sophisticated and environmentally relevant risk assessment framework for contaminants.

Rubén Rasines Ladero

Predoctoral Researcher

Degree in Environmental Sciences from Alcalá University, Madrid. Spain.
MSc in Hidrology and Water Resources Management at Alcalá University and Rey Juan Carlos University, Madrid. Spain.
Research: Ecological assessment of the subsurface water quality from the hyporheic zone.

Mª Ángeles Lezcano Vega

Predoctoral Researcher

Degree in Environmental Sciences from Autonomous University of Madrid. Spain.
MSc in Inland water quality Assessment by UAM and Mälardalen University, Sweden.
Research: Toxic cyanobacteria from freshwater Systems. Molecular methods for their biological control.

Jesús Morón López

Research Support

Degree in Biology from University of Seville, Sevilla, Spain.
MSc: Molecular Genetics and Biotechnology.
Research: Toxic Cianobacteria in fresh water reservoirs

Amanda Prado de Nicolás

Predoctoral Researcher

Degree in Biology at University Rey Juan Carlos.
MSc in Biotechnology at University Autónoma of Madrid.
Research: Wastewater treatment through the use of electrogenic wetlands with electroactive biochar as a biofilter substrate.

Colin Wardman
Predoctoral Researcher

Degree in Science in Marine Biology from Humboldt State University in California.
MSc in Science in Microbiology from the University of Massachusetts.
Research: Microbial electrochemical technologies.

Alba Arenas Sánchez
Predoctoral Researcher

Degree in Environmental Science at Autonomous University of Madrid.
MSc in Aquatic Ecology and Water Quality at Wageningen University and Research Centre, Holland.
Research: Vulnerability assessment of aquatic ecosystems to multiple stressors in the Mediterranean área.

Anna Sundberg
Research Support

Degree in Biology and Molecular Biology from Uppsala University.
MSc in Environmental Water Management from Cranfield University.
MSc in Limnology from Uppsala University
Research: Intelligent system to optimize the use of water in agricultura. Smart-Hydro Project.

Andrea Castaño Sánchez
Research Support

Degree in Biology from Complutense University of Madrid.
MSc in Environmental Geology from the Complutense University of Madrid.
Research: Ecotoxicology in macroinvertebrates.

Lucía Nieto Reyes
Research Support

Degree in Biology from University of Seville.
Research: Toxic Cianobacteria in freshwater.

Marina Ramírez Moreno
Research Support

Degree in Chemistry from University of Alcalá.
MSc in Fine Chemicals.
Research: European H2020 research project MIDES “Microbial Desalination for Low Energy Drinking Water”.

water and climate change

Dr. Juan Antonio Pascual Aguilar

Associated Researcher

Graduated in Geography in 1991 from the University of Valencia where he later obtained his PhD in Geography. He has taken part in 9 Spanish and European competitive projects and more than 30 non competitive projects through academic and private contracts.

He has published more than 40 papers between book chapters and journals, apart from other literature presented at scientific meetings. He has participated as lecturer in 2 MsC programmes and given several guest talks at national and international meetings.

His research centres on the spatial analysis and temporal study of environmental land use and water processes using the application of models and Geographical Information Systems. He has also developed his expertise in landscape assessment, particularly on issues related with the preservation of traditional agricultural patterns and water use.

Dr Andrés Díez Herrero

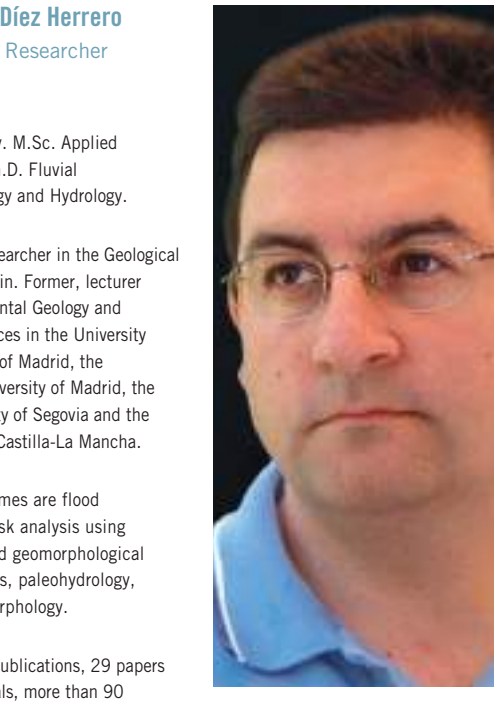
Associated Researcher

B.Sc. Geology. M.Sc. Applied Hydrology. Ph.D. Fluvial Geomorphology and Hydrology.

Full-time Researcher in the Geological Survey of Spain. Former, lecturer on Environmental Geology and Water Resources in the University Complutense of Madrid, the European University of Madrid, the SEK University of Segovia and the University of Castilla-La Mancha.

Research themes are flood hazard and risk analysis using geological and geomorphological methodologies, paleohydrology, dendrogeomorphology.

He has 208 publications, 29 papers on SCI Journals, more than 90 chapters on scientific books and more than 95 contributions to congresses and meetings.



economic and institutional analysis

Dr. Carlos Mario Gómez Gómez

Associated Researcher

Carlos Mario Gómez is Professor of Economics at the University of Alcalá since 1996. Graduated in Political Science (in Colombia) and Economics (in Spain), Master's in Agricultural Economics and Development at the University of London in 1992. He received his Ph.D. degree in Economics at the University of Alcalá (Madrid). He was appointed as a Research Associate at the Institute of Business and Economic Research of the University of California Berkeley in 1994, and as a Visiting Scholar for a sabbatical leave in 2000.

He has done extensive research on environmental economics with emphasis on water economics which was published in different peer reviewed national and international journals. Since 2000 he has led a sequence of competitive national projects and has been involved in the national and European economic analysis groups formed to support the implementation of the Water Framework Directive.

At IMDEA he is currently leading the research team of the EPI Water project approved in 2010 under the Seventh Framework Program of the European Union.

Gonzalo Delacámara Andrés

Researcher

Senior academic and water resources management and water economics specialist. He is currently a Research Fellow and Coordinator of the Department of Economic and Institutional Analysis of Water at IMDEA Water Institute and Faculty Member of the Belpasso International Summer School in Environmental and Natural Resource Economics.

He has recently worked on decision-making techniques for the Environment Agency (2015), as part of the support of that regulator to water utilities in England and Wales. His current roles include water policy advisor to the European Commission (EC DG ENV) as part of the Water Framework Directive (WFD) Common Implementation Strategy (CIS) Working Group on Economics and to the the European Parliament (2014-2018).

He is also water policy advisor for the World Bank as part of the 2030 Water Resources Group (WB, IFC, WEF – 2013-2016) framework contracts in which he has led the hydroeconomic analysis of water investments in the Pacific coastal catchments of Peru and is currently leading the work stream on the economic valuation of water resources and the use of economic incentives for water management in Mongolia, as well as the hydroeconomic analysis in two mining regions and the capital city (Ulaanbaatar).

He is an international consultant on water and energy economics for UN agencies such as ECLAC, FAO, WHO-PAHO, UNDP and UNESCO, and international development banks

(WB; IFC, IDB). Within a wide range of economic analysis assignments, he has worked on different studies to link water policy and macroeconomic performance in the EU (2013-2015), as part of the so-called European Semester. He has also coordinated the research team for the EU FP7 EPI-Water project (2011-2013) on economic policy instruments for sustainable water management, in which an economic assessment of environmental outcomes of EPIs was a key outcome.

Gonzalo also coordinates IMDEA's contribution to the EIP-Water Action Group RiverRes and to the study for DG environment on maximising water reuse in the EU. Within the newly H2020 granted project AQUACROSS (2015-2018), Gonzalo leads the development of a common framework for the assessment of aquatic ecosystems.

Dr. Alberto del Villar García

Associated Researcher

Professor in the Department of Applied Economics at University of Alcalá. Bachelor of Economics and Business Administration (UNED), Master in Public Finance and Taxation (IEF) and PhD in Economics (University of Alcalá). He has teach in numerous courses and seminars on different aspects related with Water Economy and Pricing, and since 1998 he teaches at the University of Alcalá.

His research is focused on analyzing the pricing mechanism, pricing and costs of water services, which have led to participate in multiple research projects and contracts, both as a partner and as principal researcher. The result of this activity has resulted in participation in conferences and publications of books and magazines nationally and internationally. Since 2002 he has participated as an expert in several focus groups related to water and in the water planning process resulting from the implementation of the Water Framework Directive in Spain.

His activity in IMDEA Water Instituted is related to the participation and collaboration in various research projects and activities related to water economy.

Marta Rodríguez Gómez

Research Support

Degree in Environmental Sciences from Autonomous University of Madrid. Spain.
MSc in Hidrology and Water Resources Management at Alcalá University and Rey Juan Carlos University, Madrid. Spain
Research: Drivers affecting the industrial structure of water and sanitation services.

Asya Amran Marhubi

Research Support

Degree in International Development Studies and Spanish & Latin American Studies.
MSc in Corporate Social Responsibility & Sustainable Development from the EOI.
Research: H2020 research project AQUACROSS: "Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services aCROSS EU policies".

Marta Arenas Romasanta

Research Support

Degree in Biology from Complutense University of Madrid.
MSc in Sustainable Development and CSR – EOI Business School.
Research: Ecological, social and economic approaches for water management.

water and energy

Dr. Marta Vivar García

Researcher

Telecommunication Engineering degree by the Polytechnic University of Madrid (UPM) and PhD on Photovoltaic Solar Energy studies by the Institute of Solar Energy within the same university (IES-UPM) in 2009. MSc on Hydrology and Water Resources Management by the University of Alcalá in 2013. She worked at the Australian National University (ANU, Australia) for three years as postdoctoral researcher, combining both research and lecturing activities. She has also worked at Tianjin University (China) for a year under Chinese public funding.

Her main research lines include the design and development of hybrid solar photovoltaic / thermal / photochemical devices that use the solar spectrum more efficiently, for the production of electricity, purified water and/or heat; and the development of low-cost clean water photovoltaic systems for solar disinfection in developing countries.

She has participated in 14 research projects, being PI in some of them. Results include 20 international journal articles, 12 national scientific journal articles, 41 communications to international conferences, 5 invited talks and 1 patent. She has supervised 18 honours and/ or master students projects and completed several research stays at ANU (Australia), ZSW (Germany), University of Ferrara (Italy), Anna University (India) and Tianjin University (China).

Dr. Manuel Fuentes Conde

Associated Researcher

He is an Industrial Engineer (U.N.E.D) and PhD in Photovoltaic Solar Energy (University of Jaén, 2009). He worked as designer in automobile industry during two years (Valeo S.L.) and then, he worked as lecturer at University of Jaén (2000), where he got his accreditation as Tenured Associate Professor (2012). Nowadays he is Associate Professor in Electronics and Automation Engineering Department at University of Jaén.

His first research line was focused in Photovoltaic Systems, specifically, in Grid Connected Photovoltaic Systems (GCPVS), developing measurement devices for PV modules and PV systems quality controls. After his postdoctoral stays in ANU (Canberra, Australia, 6 months) and Tianjin University (Tianjin, China, 4 months) he opened a new research line focused on water purification thanks to hybrid photovoltaic-photocatalytic systems and hybrid autonomous systems (renewable energies-fuel) based on low cost design for its monitoring and management.

He has participated in 23 research projects, contracts and agreements, being the leader and principal researcher in some of them. The research results include 13 papers in international journals (JRC), 8 papers in national journals, more than 30 publications in international conferences, 3 invited talks and one patent. He is reviewer of 6 journals gathered in the ISI Science JCR and supervisor of more than 20 honour student projects of Technical Degrees.

Natalia Pichel Mira
Research support

Degree in Environmental Science at the University of León.
MSc in Water Quality Science and Technology at the University of Granada.
Research: PV-photochemical systems for water treatment.

Ascensión López Vargas
Research support

Degree in Telecommunications Engineering at the University of Alcala.
MSc in Communications and Information Technologies at the University of Alcalá.
MSc in Aerospace Research at the University of Alcala.
Research: Solar photovoltaic-photochemical-thermal hybrid systems, clean water photovoltaic sensors for solar disinfection.

laboratory technicians

Francisco Martínez Serrano
Laboratory Technician

IVT: Environmental Chemistry.

Carolina Guillén Fuentes
Laboratory Technician

IVT: Control and Analysis.
IVT: Environmental Chemistry.

Amaya Romero Salas
Laboratory Technician

IVT: Control and Analysis.

Covadonga Alonso Alonso
Laboratory Technician

Degree in Chemistry by the Autonomous University of Madrid, Spain.

Dr. María Isabel López a
Laboratory Technician

PhD in Analytical Chemistry by Complutense University of Madrid, Spain.

Beatriz Peinado Rodríguez
Laboratory Technician

IVT: Environmental Health
IVT: Clinical Diagnostic Laboratory.

Laura Cherta Cucala
Laboratory Technician

PhD in Analytical Chemistry by the Institute for Pesticides and Water of the University Jaume I.

Patricia García Doncel
Research support

Degree in Chemistry at the University of Alcala.

management area and administration

Rafael Irastorza Vaca
Manager

Degree in Economic Sciences.

Juana Sanz García
R&D Management

PhD in Environmental Sciences.

María Luz Barquilla Crespo
Accountant Technician

Degree in Economic Sciences.

José Ángel Gómez Martín
Technology transfer technician

Degree in Environmental Sciences.

Lucía Freire Cordero
R&D Technical support

Degree in Environmental Sciences.

Celia Barral Nieto
Technician in Administration and Finance

Josefa Simón Recio
Secretary

infrastructures and scientific equipment

4.1. Water Laboratory [51]
4.2. Biology and Microbiology Laboratory [55]
4.3. Pilot Plants [57]
4.4. Geomatic Laboratory [58]
4.5. Soil Laboratory [59]
4.6. Water and Energy Laboratory [60]

annual report 2016

IMDEA Water laboratories are part of the Network of Laboratories and Research Infrastructures of the Community of Madrid since 2009 with the reference number 267.

4.1. Water Laboratory

4.1.1. Organic and inorganic microocontaminants

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. Chromatography is essentially a physical method of separation, in which the components to be separated are distributed in two phases: the stationary phase, with a large surface area and the mobile phase, which runs continuously throughout the stationary phase. Chromatographic processes take place as a result of the repeated absorptions and desorptions during movement of the sample components throughout the stationary phase, achieving separation of the same according to their distribution coefficients. The final outcome is that the components of the mix come out separated depending on their retention times, which constitutes the chromatogram. Through the chromatogram it is possible to identify the separated substances qualitatively and quantitatively.

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.

Equipment

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

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.

Applications

With detection by conductivity.

- Anion analysis (F-, Cl-, NO2-, Br-, NO3-, PO43-, SO42-) in aqueous matrices.
- Cation analysis (Na+, NH4+, K+, Mg2+, Ca2+) in aqueous matrices.

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.

4.1.2. Inductively Coupled Plasma Mass Spectrometry (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. The liquid sample is introduced through a misting system and transformed into a fine spray which is directed towards the torch where a plasma is generated, whose temperature can reach up to 10,000 K, by submitting a flow of argon gas to the action of an oscillating magnetic field induced by a high frequency current. The sample is subjected to various processes (desolvation, vaporisation, atomisation and ionisation). The ions generated pass into the mass spectrometer through a conditioning interface, where they are focused and aimed towards the analyser, usually quadrupole type, where they are separated according to their mass/charge ratio (m/z).

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 uL).
- Analysing solid biological, organic and inorganic samples by acid digestion and microwave treatments.
- Environmental applications (waters, soils, sediments and residues).
- Determinig metals and possible contaminants in soils (fertilisers) and inland drinking waters (dumping).
- Speciation of metals in complex matrices.
- Quantification of inorganic nanoparticles.

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).

4.1.3. 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. Mass Spectrometry is a powerful analytical technique based on the different behaviours of the ions formed by different ionisation techniques when passing through electrical and magnetic fields. 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.

Applications

The laboratory analyses the different types of organic/inorganic contaminants in line with current regulations on maximum residue limits. The following features are highlighted:

- 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 to adapt to the new requirements laid down in current legislation on monitoring water quality and control parameters

Equipment

- Bidimensional Gas Chromatography/ MS (GC x GC/TOF). Pegasus 4D GC x GC TOFMS (LECO) and GC model 7890A from Agilent Technologies.
- Gas Chromatography / Triple Quadrupole (GC-MS/MS (QqQ)). GC model 7890A and triple quadrupole detector model 7000 (Agilent Technologies). This system is coupled to a Gerstel twister brand Autosampler (MultiPurpose Sampler model 2XL).
- Liquid Chromatography /Triple TOF (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 (QqQ)) (model 6495A, Agilent Technologies).

4.1.4. 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.

Applications

- Organoleptic assays: Colour and turbidity.
- Physical-chemical testing: Basic parameters such as pH, conductivity, temperatura, redox potential, TKN (Total Kjeldahl Nitrogen), total phosphorus, free and total chlorine, alkalinity, suspended solids (TSS), total organic carbon (TOC), DBO5, DQO, total nitrogen, etc.

Equipment

- Particle counter for water samples. This equipment is able to count particles of sizes ranging between 0.2 microns and 2 microns. LS_200 model from Particle Measuring System Inc.
- Visible UV spectrophotometer. Measurements at different wavelengths and obtaining Vis-UV spectra of compounds (190-1.100 nm). UV-1800 model from Shimadzu. Espectrofotómetro UV-Visible.
- Total Organic Carbon (TOC) Analyser. TOC-V CSH model. Shimadzu brand.Analizador de Carbono Orgánico Total (TOC).

4.2. Biology and Microbiology Laboratory

IMDEA Water hosts a biological laboratory providing analysis on surface and groundwater to:

- Support monitoring programs of water quality by means of national and international standardized methods and in agreement with WFD 2000/60/CE y GWD 2006/118/CE.
- Monitor cyanobacterial blooms and their toxins in surface water and to develop technological solutions for removal of cyanotoxins during water treatment.
- Monitor crustacean communities from groundwater and groundwater dependent ecosystems (hyporheic zone of rivers and streams) to provide an integrated assessment of groundwater systems.

Applications

- Groundwater and groundwater dependent ecosystems (GDEs) (i.e. hyporheic zone of rivers) monitoring and biodiversity assessment.

- Distribution of stygobites invertebrates in groundwater ecosystems (inland and coastal aquifers).
- Assessment of groundwater ecosystems health.
- Surface water bodies monitoring (rivers, lakes, rivers) based on biological indicators (invertebrates).
- Specimens identification of cyanobacteria, cyclopoids and ostracods to the lowest taxonomic level rank.
- Aquacultures and ecotoxicology tests (bioassays, chronic, acute and sublethal assays) for and integrated biological monitoring of water quality supporting physico-chemical and bacteriological tests.
- Biodegradation of cyanotoxins and diversity of biodegrading bacterial populations using classic gene markers and metagenomics studies.
- Developing molecular tools for monitoring cyanobacterial blooms and their toxins in surface water.
- Developing technological solution for biological monitoring and elimination of cyanotoxins during water treatment.
- Toxicity tests with aquatic organisms at the individual, population and community level (using micro-/mesocosms).

Equipment

Ecohydrology unit: the microbiological unit is equipped with fully high-quality optical microscopes systems available with high-resolution photo-montage systems for invertebrate's identifications and aquaculture:

- Light microscope, Olympus CX41.
- Stereo microscope, Olympus SZX10.
- Stereo microscope, Olympus SZX7.
- Stereo microscope, Olympus SZ51.
- Digital photo camera, Olympus.
- Incubator for groundwater invertebrates.
- Aquacultures aquariums.

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:

- Gel Documentation System, AlphaImager, for documentation of gel electropheresis.
- Real Time PCR machine, AB7300, for quantitative and qualitative gene studies.
- Nano-photometer, Epoch, for measuring DNA concentration in as low as 2 µl volume.
- Gel Electrophoresis Equipment, Biorad, for electrophoresis of DNA and RNA.
- PCR Thermocycler, to perform PCR reaction.
- Homogenizer for DNA extraction, Precellys, to extract DNA from bacterial cells.

4.3. Pilot Plants

Membrane technology

Membrane technology is a generic term used for any separation process in which membranes are employed. A membrane can be defined as a physical barrier separating two phases and allowing a selective transportation of compounds from one phase to the other. The part that goes through the membrane is the permeate and the part that is rejected by the membrane is the retentate.

Applications

Membrane technology can be applied for purposes such as:

- Water purification: undesired impurities are removed from the solution. For example: soft water production by the removal of calcium and magnesium cations.
- Concentration: required components are present at a low concentration and the solvent is removed. For example: fruit juice concentration by removing water.
- Fractionation: a mixture must be separated into two or more desired components. For example: milk fractionation in dairy industry.

Membranes can be classified depending on the compounds that membranes are capable of separating.

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

- A laboratory-scale cross-flow stainless steel test unit for flat-sheet membranes. The system can be used as a microfiltration, ultrafiltration, nanofiltration or reverse osmosis.
- Spiral wound ultrafiltration and reverse osmosis membrane pilot plants that can be coupled and used in serie.

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. Currently, different designs and configurations for the treatment of urban and industrial wastewater are operated under controlled conditions before passing to the real scale. The plant is also the site of testing activities funded by prestigious innovation programs such as H2020.

4.4. Geomatic Laboratory

There is a need of development of tools to support the management of the water resource, through the correct assessment of the present state of the resource and its possible evolution in different scenarios. IMDEA Water works on the methodological development and application of different tools for management support, including remote sensing, spatial databases or geodatabase construction and design, and geological and hydrological modelling.

Remote sensing techniques allow locating and estimating with the required precision some important terrain features as crop evapotranspiration, land uses, vegetation index, etc. Geodatabases records and arranges all that information, giving as result a GIS (Geographic Information System) enables to analyse the topological and quantitative relationships of different variables. The knowledge of those variables and their relations are materialized in an implement of a Hydrological Information System. This will allow performing the hydrological model, and will be the basis for decision-making in the resource management.

Hydrogeological modelling through individual numerical models, and/or coupled to hydrogeochemical models, allows the evaluation of water resources in terms of quantity and quality, facilitating the management of both surface water and groundwater.

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.

Applications research and services

- Irrigation.
- Water planning.
- Water footprint.
- Pollution control.
- Quality control.
- Floods and droughts.
- Hydraulic heritage.
- Ecological status of water bodies.
- Reuse.

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).

4.5. Soil Laboratory

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.

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+, Ca2+, Mg2+).
- Exchangeable aluminium.
- Metals.
- Phosphates retention.
- Assimilable boron.
- Calcium carbonate equivalent content.
- Amorphous content (Si, Al, Fe).
- Total organic carbon content.
- Moisture retention curve.

Equipment

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

4.6. Water and Energy Laboratory

Manufacturing

Soldering station, vacuum pumps and chambers for cell encapsulation with silicone.

Electronic testing

- DC power supply.
- Oscilloscope.
- Function generator.
- Bench multimeter.
- Datalogger.
- Basic sun simulator (artificial lamp).

Outdoors monitoring

- Pyranometer.
- UV radiometer.
- Portable spectroradiometer.
- Temperature sensor, wind speed, wind direction.
- Portable datalogger.
- Calibrated solar cells.
- Pumps.
- Shunt resistors for PV modules testing.
- Flowmeters.
- Hand multimeters.
- Waterproof temperature sensors.
- RTD sensors for modules temperatures.
- Adjustable mounting structure.

research results and knowledge dissemination

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5.1. Scientific Papers

5.1.1. Articles in journals

1. Aguirre-Sierra, A. and Bacchetti, T. and Berná, A. and Salas, J.J. and Aragón, C.A. and Esteve-Núñez, A. (2016) *Microbial electrochemical systems outperform fixed-bed biofilters in cleaning up urban wastewater.* Environmental Science: Water Research and Technology, 2 (6). pp. 984-993. ISSN 2053-1400.

2. Ali, H. and Rico, A. and Murshed-e-Jahan, K. and Belton, B. (2016) *An assessment of chemical and biological product use in aquaculture in Bangladesh.* Aquaculture, 454. pp. 199-209. ISSN 00448486.

3. Arenas, A. and Rico, A. and Vighi, M. (2016) *Effects of water scarcity and chemical pollution in aquatic ecosystems: State of the art.* Science of The Total Environment, 572. pp. 390-403. ISSN 00489697.

4. Bodoque, J.M. and Amérigo, M. and Díez-Herrero, A. and García, J.A. and Cortés, B. and Ballesteros-Cánovas, J.A. and Olcina, J. (2016) *Improvement of resilience of urban areas by integrating social perception in flash-flood risk management.* Journal of Hydrology, 541. pp. 665-676. ISSN 00221694.

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6. Domínguez-Garay, A. and Boltes, K. and Esteve-Núñez, A. (2016) *Cleaning-up atrazine-polluted soil by using Microbial Electroremediating Cells.* Chemosphere, 161. pp. 365-371. ISSN 00456535.

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8. Fernández-Freire, P. and Peropadre, A. and Rosal, R. and Pérez-Martín, J.M. and Hazen, M.J. (2016*) Toxicological assessment of third generation (G3) poly (amidoamine) dendrimers using the Allium cepa test.* Science of The Total Environment, 563-56. pp. 899-903. ISSN 00489697.

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10. Grisoni F., Viviana Consonni V., Vighi M., Villa S., Todeschini R. (2016) *Investigating the mechanisms of bioconcentration through QSAR classification trees.* Environment International 88. pp. 198–205.

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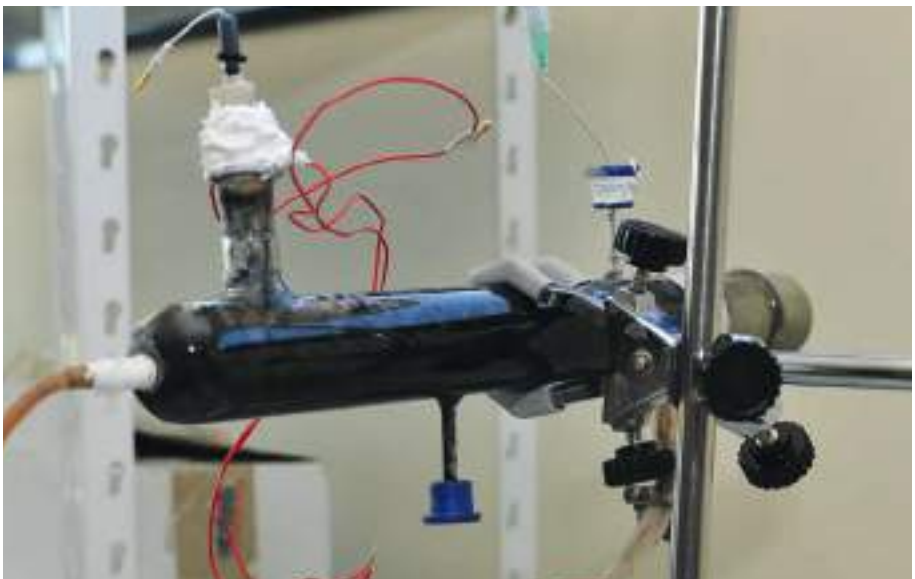

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2. Mostaza, D. and Carreño, F. and Iepure, S. (2016) *Análisis del efecto de la extracción de agua para riego de un acuífero aluvial. Caso de estudio: Masa de Agua Subterránea (030.007) "Aluviales: Jarama-Tajuña" y Finca Experimental "La Isla" (IMIDRA, Arganda del Rey - Madrid).* 13 Congreso Nacional de Medio Ambiente. ISSN 978-84-617-7390-9.

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5.1.3. Books

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5.1.4. Books Chapters

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5.1.5. Scientific-Technical Reports

1. Banerjee, R and Möller-Gulland, J. and Fawcett, C. and Smith, C. and Delacámara, G. and Lkhagvadorj, B. and Bayarsaikhan, E. and Kirhensteine, I. and Gil, E. and Sreenivas, N. (2016) Hydro-economic Analysis on Cost-Effective Solutions to Close Ulaanbaatar's Future Water Gap. Technical Report. Technical Report. The World Bank 2030 WRG (Water Resources Group).

2. Gómez, C.M. and Delacámara, G. and Arévalo-Torres, J. and Barbière, J. and Barbosa, A.L. and Boteler, B. and Culhane, F. and Daam, M. and Gosselin, M-P. and Hein, T. and Iglesias-Campos, A. and Jähnig, S. and Lago, M. and Langhans, S. and Martínez-López, J. and Nogueira, A. and Lillebø, A. and O'Higgins, T. and Piet, G. and Pletterbauer, F. and Pusch, M. and Reichert, P. and Robinson, L. and Rouillard, J and Schlüter, M. (2016) The AQUACROSS Innovative Concept. Deliverable 3.1. European Union's Horizon 2020 Framework Programme for Research and Innovation Grant Agreement No. 642317. Technical Report. European Union (H2020 FP Grant Agreement)-AQUACROSS.

5.2. Lectures

1. De Bustamante, I. *¡De Agua va!* Ceremonia de entrega de los Premios Manantial 2016. Club del Agua Subterránea. Madrid. 2 December.

2. De Bustamante, I. *La reutilización de aguas regeneradas: Impactos sobre las aguas subterráneas.* Acto de inauguración del 50 Curso Internacional de Hidrología Subterránea. Fundación Centro Internacional de Hidrología Subterránea. Barcelona. 11 January.

3. Delacámara, G. *Acceso a los servicios de agua potable y saneamiento.* Diálogos de Política Pública, Instituto de Estudios Peruanos, PUCP. Lima, Perú. 30 September.

4. Delacámara, G. *Construyendo la cultura del agua (ODS 6) – Las verdades incómodas en torno al agua.* Simposio Internacional Empresa y Gestión Sostenible, Perú 2021. Lima, Perú. 28 September.

5. Delacámara, G. *El ciclo integral del agua. Del recurso a los servicios urbanos, desafíos globales*. I Foro de la Economía del Agua: Agua y Sostenibilidad. Madrid. 8 April.

6. Delacámara, G. *El modelo de gestión: alianzas entre la sociedad civil, el sector público y el privado* II Foro de la Economía del Agua: Agua y Sostenibilidad. Madrid. 7 July.

7. Delacámara, G. *Gestión estratégica y fortalecimiento institucional en torno al agua.* Sociedad Nacional de Minería, Petróleo y Energía (SNMPE). Lima, Perú. 28 September.

8. Delacámara, G. *La gestión del agua en Perú – el reto ineludible de la gobernanza*. 2030 WRG Steering Committee. Lima, Perú. 29 September.

9. Delacámara, G. *Las Medidas Naturales de Retención de Agua: génesis y desarrollo actual en Europa*. Jornada sobre Medidas Naturales de Retención de Agua – NWRM (Natural Water Retention Measures). Escuela Universitaria de Ingeniería Técnica Forestal, Universidad Politécnica de Madrid. Madrid. 8 March.

10. Delacámara, G. *Mitos líquidos. La economía del agua*. Foro La Región. Orense. 27 October.

11. Esteve-Núñez, A. *Aplicaciones ambientales de los sistemas electroquímicos microbianas: Del laboratorio al mercado*. Jornada "Negocios tecnológicos en busca de dueño. Oportunidades de inversión en negocios de base tecnológica y líneas de financiación". Cámara Oficial de Comercio, Industria y Servicios de Madrid. 19 October.

12. Esteve-Núñez, A. *METs Meet Water at Full Scale: From Nano to Kilo*. 13ª Conferencia de la International Water Association (IWA) sobre Tecnologías de Tratamiento de Aguas Residuales. Jerez. 13 - 16 June.

13. García-Calvo, E. *Agua y salud a lo largo de la historia.* V Edición del Curso de Divulgación "Los Avances de la Química y su Impacto en la Sociedad". Madrid. 21 April.

14. García-Calvo, E. *La I+D+i en IMDEA Agua.* Coloquio del Observatorio del Agua. Fundación Botín. Madrid 18 February.

15. García-Calvo, E. *La visión de un instituto líder en investigación sobre el agua.* 11º Foro del Agua "Agua, datos e internet: Cóctel de valor y empleo". Fundación Canal. Madrid. 1 June.

16. Gómez, C.M. *¿Cómo garantizar la financiación para la seguridad hídrica de las ciudades?* II Foro de la Economía del Agua: Agua y Sostenibilidad. Madrid. 7 July

17. Gómez, C.M. *Governance and Innovation in the Water Sector: The Critical Role of Economic Incentives.* 1st International Conference on Sustainable Water Processing. Sitges, España. 11 - 14 September.

18. Gómez, C.M. *Malversación del agua: el agua y su uso sostenible.* Master class "Water and Jobs, the Power to Transform our Lives", organizada por la Fundación We Are Water en el marco del Día Mundial del Agua. Roca Barcelona Gallery. Barcelona. 15 March.

19. Vighi, M. *Ecological risk of pharmaceuticals in the aquatic environment.* Workshop Leading edge technologies for the removal of emerging pollutants. Organizado por Remtavares, en colaboración con Traguanet. Universidad Rey Juan Carlos. Madrid. 24 - 25 November.

20. Mostaza, D. *Análisis del efecto de la extracción de agua para riego de un acuífero aluvial. Caso de estudio: Masa de Agua Subterránea (030.007) "Aluviales: Jarama-Tajuña" y Finca Experimental "La Isla" (IMIDRA, Arganda del Rey - Madrid).* 13º Congreso Nacional de Medio Ambiente. Madrid. 28 November - 1 December.

5.3. Round Tables

1. Delacámara, G. *Ciclo urbano del agua.* XI Foro de iAgua Magazine (FiAM). Madrid. 21 April.

2. Delacámara, G. *Desafíos a la seguridad hídrica de las ciudades en América Latina y Europa: la mirada de largo plazo.* III Foro de la Economía del Agua. Madrid. 24 November.

3. Delacámara, G. *y* Gómez, CM. *Diálogo sobre Economía del Agua.* III Foro de la Economía del Agua. Madrid. 24 November.

4. Delacámara, G. *Machinea,* J.L. El Ciclo integral del agua. Del recurso a los servicios urbanos, desafíos globales. I Foro de la Economía del Agua. Madrid. 8 April.

5. Delacámara, G. El modelo de gestión: alianzas entre la sociedad civil, el sector público y el privado. II Foro de la Economía del Agua: Agua y Sostenibilidad. Madrid. 7 July.

6. Delacámara, G. *Gobernanza de recursos escasos y ciudades. Hacia una gestión sostenible del ciclo urbano del agua.* II Jornada "Agua y sostenibilidad. Gestionando recursos escasos. Instrumentos para su mejor gobernanza". Cátedra del Agua y la Sostenibilidad de la Universidad de Murcia. 7 October.

7. Delacámara, G. *Gorbernanza (Regulación).* Fórum del Salón Internacioanial del Ciclo Integral del Agua (Iwater): Resiliencia, gobernanza y financiación: claves para el futuro del sector del agua. Barcelona. 15 - 17 November.

8. Delacámara, G. *La riqueza del agua.* Foro ABC del Agua. Madrid. 8 June.

9. Delacámara, G. *Panel de discusión: El Modelo de Gestión Hídrica en España y las oportunidades de colaboración en América Latina.* Jornada "II Diálogos del Agua América Latina - España. Retos para la seguridad hídrica". Organizada por el Banco de Desarrollo de América Latina (CAF) en colaboración con el Gobierno de España. Madrid. 6 September.

round tables

10. García-Calvo, E. *Innovación y avances tecnológicos en materia de regeneración de aguas*. Jornada la reutilización del agua en el marco de la economía circular. AEDyR y AEAS con la colaboración, de IMDEA Agua. Madrid. 10 May.

11. García-Calvo, E. *Hacia un uso sostenible del agua*. XII Reunión de la Mesa Española de Tratamiento de Aguas (META). Centro Cultural La Corrala, Madrid. 20 - 22 June.

12. Landaburu-Aguirre, J. Colaborador técnico en la Sesión Técnica 23: *El agua en la economía circular*. 13º Congreso Nacional de Medio Ambiente, CONAMA 2016. Madrid. 30 November.

13. Lillo, J. Investigación en contaminación de áreas mineras. FESCET 2016. Universidad Rey Juan Carlos. Móstoles. 24 February.

14. Molina, S. Colaborador técnico en la Sesión Técnica 32: *Hacia el vertido cero*. 13º Congreso Nacional de Medio Ambiente, CONAMA 2016. Madrid. 30 November.

participation in scientific committees

5.4. Participation in Scientific Committees

1. Candela, L. Member of Scientific Committee of "Spanish-Portuguese Congress on groundwater in the second cycle of WFD River Basin Management Planning". Organised by the International Association of Hydrogeologist - Spanish and Portuguese Groups.

2. De Bustamante, I. Spanish-Portuguese Congress on groundwater in the second cycle of WFD River Basin Management Planning". Organised by the International Association of Hydrogeologist - Spanish and Portuguese Groups.

3. De Bustamante, I. Member of Scientific-technical Committee. III Simposium about water management in protected areas. IMDEA Water, CNAP and IGME. Cuba.

4. Delacámara, G. Academic Director and member of the Forum on Water Economics Academic Committee.

5. El-Shehawy, R. Member of Scientific Board (Advisory Board) of ENMRI-Alejandría, Egipto (Environmental and Natural Materials Research Institute).

6. Esteve, A. Member of Scientific Committee of EU-ISMET 2016. Organsed by International Society for Microbial Electrochemistry and Technology. Roma, Italia.

7. Esteve, A. Member of Scientific Committee of 13th IWA Leading Edge conference on water and wastewater technologies. Organised by International Water Association.

8. García Calvo, E. Member of the Honorary Committee. III Simposium about water management in protected areas. IMDEA Water, CNAP and IGME. Cuba.

9. Gómez, C.M. Member of the Academic Committee of the Forum on Water Economics.

10. Vighi, M. Member of the Scientific Committee "Health, Environmental and Emerging Risk". (SCHEER). Commission Decision C(2015)5383, Directorate General for Health and Food Safety, European commission.

5.5. Oral Communications

1. Aparicio, J.O., Candela, L., Alfranca, O. Costo de la desalobración de aguas subterráneas con pequeñas plantas desalobradoras (< 2.200 m^3/día) y su uso en el Campo de Cartagena. Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos. Grupo Español y Grupo Portugués. Madrid. 28 - 30 November.

2. Arenas-Sánchez, A., Rico, A., Vighi, M. *Assessing the effects of pollution and water scarcity on the vulnerability of aquatic communities in (semi-)arid regions.* NET-SCARCE Conference. Barcelona, España. 15-16 November.

3. Barroeta García, B., Esteve Núñez, A. *iMETland: A new generation of Microbial Electrochemical Wetland for effective decentralized wastewater treatment.* Conferencia. Europeo. "WssTP Brokerage and Working Groups Event". Bruselas, Bélgica. 23 November.

4. Castaño-Sánchez, A., Iepure, S., Di Lorenzo, T., García-Doncel, P., Alonso-Alonso, C., Petre, A. *Human pharmaceutical compounds: the side effects of medication on aquatic species.* Workshop Leading edge technologies for the removal of emerging pollutants. Organizado por Remtavares, en colaboración con Traguanet. Universidad Rey Juan Carlos. Madrid. 24 - 25 November.

5. Castaño-Sánchez, A., Iepure, S., Di Lorenzo, T., García-Doncel, P., Alonso-Alonso, C., Petre, A. *Testing the acute toxicity of human pharmaceutical compounds on groundwater (Diacyclops crassicaudis crassicaudis Sars, 1863) and Surface crustacean species (Dapnia magna Müller, 1785).* Sesión "Ecotoxicology and emergent environmental contaminants". XVIII Congreso de la Asociación Ibérica de Limnología (AIL): El agua es vida. Asociación Ibérica de Limnología (AIL) y el Institut de Recerca i Tecnologia Agroalimentàries (IRTA). Tortosa, Tarragona. 4 - 8 July.

6. Cabrera, M.C., De Paoli, F., Naranjo, G., Cruz-Fuentes, T., Hernández-Quesada, M.P., Estévez, E., Martín, L.F., Custodio, E. *La estimación de la recarga natural al acuífero del norte de Gran Canaria: comparación de diferentes metodologías.* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos -Grupo Español y Grupo Portugués. Madrid. 28 - 30 November.

7. Candela, L. *Contaminantes emergentes en aguas subterráneas: origen, presencia y aspectos normativos.* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos -Grupo Español y Grupo Portugués. Madrid. 28 - 30 November.

oral communications

8. De Bustamante, I., Cabrera, M.C., Echegaray, M., Candela, L., Pérez Barbón, A., Martínez-Hernández, V. *Reutilización de aguas regeneradas en el marco de la planificación hidrológica.* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos -Grupo Español y Grupo Portugués. Madrid. 28 - 30 November.

9. Esteve Núñez, A. Microbial Electrochemical Systems: from nano-metre to cubic-metre. Workshop Up-scaling of BES towards application. Leeuwarden, Países Bajos. 10 and 11 March.

10. Esteve, A., Berná, A., Ortiz, J.M., Rodrigo, J.F., Letón, P., Tejedor, S. *Microbes And Electrochemistry Partnering for a Complete Treatment of an Industrial Brewery Wastewater.* Congreso 13th IWA Leading Edge Conference on Water and Wastewater Technologies. Jerez de la Frontera. 13 - 17 June.

11. Esteve Núñez, A.; Salas, J.J. Full scale MET-assisted biofilters for urban wastewater treatment: The H2020 imetland project. Congreso internacional 13th IWA Specialized Conference on Small Water and Wastewater Systems (SWWS). Atenas, Grecia. 14-16 September.

12. García-Pacheco, R., Rabadán, F. J., Terrero, P., Molina Martínez, S., Martínez, D., Campos, E., et al. *LIFE+13 TRANSFOMEM: un ejemplo de reciclaje en el mundo de la desalación.* XI Congreso Internacional AEDyR. Valencia. 19 - 21 October.

13. Henriksson, PJG., Rico, A., Klinger, D., Troell, M., Buschmann, AR., Saksida, SM., Mohan, CV., Zhang, W. *Unpacking factors influencing antimicrobial use in global aquaculture and their implication for management.* 4th International Conference on Responsible Use of Antibiotics in Animals. La Haya, Países Bajos. 26 - 28 September.

14. Iepure, S., Castaño A., Di Lorenzo, T., García-Doncel, P., Alonso-Alonso, C., Petre, A. *Human pharmaceutical compounds in aquatic ecosystems – the significance of ecotoxicological approach.* Watershed Technology Conference. Quito, Ecuador. 3 – 9 December.

15. Iepure, S., Sundberg, A., Vázquez-Gonzalés, A., Mostaza, D., Carreño, F. *Groundwater ecosystem services & agriculture: an ecological approach towards the sustainable use of artificially recharged aquifers.* Watershed Technology Conference. Quito, Ecuador. 3 – 9 December.

16. Lezcano, M.Á. *Interaction and seasonal dynamics between toxic cyanobacteria and microcystin-degrading bacteria in aquatic systems.* 10th Int. Conference on Toxic Cyanobacteria. Wuhan, China. 23-28 October.

17. Martínez-Hernández, V., Leal, M., Meffe, R., De Bustamante, I., Lillo, J. *El antiinflamatorio Naproxeno: sorción, biodegradación y tratamiento a través de materiales reactivos.* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos -Grupo Español y Grupo Portugués. Madrid. 28 - 30 November.

18. Matthies, M., Solomon, K., Vighi, M., Gilman, A., Tarazona, J. *The Origin and Evolution of Persistence Criteria for PBT Chemicals and Persistent Organic Pollutants.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

19. Ortiz, J.M., Borjas, A., Esteve-Núñez, A. *Desarrollo de pilas de desalinización microbianas para la obtención de agua a bajo coste: descripción del comportamiento electroquímico.* XXXVII Reunión del Grupo de Electroquímica de la Real Sociedad Española de Química. Universidad de Alicante. San Vicente del Raspeig. 17 - 20 July.

20. Ortiz, J.M., Borjas, Z., Rogalla, F., Esteve-Nuñez, A. *Low-energy drinking water production and simultaneous wastewater treatment using microbial desalination cells: experimental results at lab scale.* European Desalination Society Conference. Roma, Italia. 22 - 26 May.

21. Ortiz, J.M., Esteve-Nuñez, A., Monsalvo, V., Rogalla, F. *Optimización de celdas microbianas de desalación para la obtención de agua potable y de reúso.* 5º Congreso Latinoamericano de Desalación y Reúso del Agua (DESAL 2016). Santiago, Chile. 5 - 7 October.

22. Ortiz de Lejarazu, A. Molina, S., Landaburu-Aguirre, J., García-Calvo, E. *Comparative study of commercial, recycled and modified nanofiltration and ultrafiltration membranes for removal of pharmaceutical compounds.* Workshop Leading edge technologies for the removal of emerging pollutants. Organizado por Remtavares, en colaboración con Traguanet. Universidad Rey Juan Carlos. Madrid. 24 - 25 November.

23. Pérez Barbón, A., Tortuero, M., Lillo, J., De Bustamante, I. *Experiencias piloto en depuración y reutilización mediante filtros verdes intensivos.* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Internacional de Hidrogeólogos -Grupos Español Portugués. Madrid. 28 - 30 November.

24. Rasines, R., Meffe, R., Carreño, F., Mostaza, D., Sundberg, A., Iepure, S., *Patterns of groundwater copepods and ostracods biodiversity and distribution in relation to aquifer types in central Spain. Hydrogeology vs. environmental factors.* Sesión "Evolutionary biology, biodiversity and conservation". XVIII Congreso de la Asociación Ibérica de Limnología (AIL): El agua es vida. Organizado por la Asociación Ibérica de Limnología (AIL) y el Institut de Recerca i Tecnologia Agroalimentàries (IRTA). Tortosa, Tarragona. 4 - 8 July.

25. Rico, A. *Mapping the lifecycle of antibiotics in Southeast-Asia.* Organized by U.S. Department of State with support from the U.S. Geological Survey adn SETAC. Singapore. 14 and 15 September.

26. Rico, A., Van den Brink, P.J., Focks, A. *Influence of chemical and non-chemical stressors on the macroinvertebrate community composition of the Danube river.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

27. Sala, S., Pasqualini, J., Vighi. M. *Reversibility assessment: how to improve the weighting of impacts in LCA.* XXVI SETAC (Society of Environ. Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

28. Scarduelli, L., Giacchini, R., Parenti, P., Vighi, M. *Natural variability of biochemical biomarkers in the macro-zoobenthos: dependence on life stage and environmental factors.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

29. Vadillo, I., Candela, L., Jiménez Gavilán, P., Urresti, B., Corada, C. *Estudio de contaminantes emergentes en acuíferos detríticos de la cuenca hidrográfica del río Guadalhorce (Málaga).* Congreso Hispano-Luso sobre las Aguas Subterráneas en el Segundo Ciclo de Planificación Hidrológica. Organizado por la Asociación Int. de Hidrogeólogos -Grupos Español y Portugués. Madrid. 28-30 November.

30. Van den Brink, PJ., Rico, A. *Ecological risk assessment of veterinary medicines applied in Asian aquaculture.* X SETAC (Society of Environmental Toxicology and Chemistry) Asia/Pacific. Singapur. 16-19 September.

5.6. Posters

1. Barroeta, B., Ortiz, J.M., Esteve, A. *Microbial Electrochemical Technologies for sustainable innovation: research, education and outreach.* Conferencia. "CASI Policy Conference 2016: Exploring Policy Options for Responsible Research, Sustainability and Innovation". Bruselas, Bélgica. 15 and 16 November.

2. Focks, A., Ter Horst, M., Adriaanse, P., Van den Berg, E., Boesten, J., Rico, A., Baveco H., Van den Brink P.J., Wipfler L. *Towards a model- and landscape-based regulatory aquatic risk assessment of pesticides: state-of-the-art and recommendations for improving fate and effect models.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

3. Guzzella, L., Marziali, L., Rabuffetti, D., Carere, M., Scaini, F., Martone, C., Forte, T., Giuliani, R., Vighi, M., Bizzotto, E., Fuchsman, P. *Ecological risk assessment for Lake Maggiore: experience gained from a participatory approach.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

4. Iepure, S., Di Lorenzo, T., Castaño-Sánchez, A., Carreño, F., Lillo, J. *Land cover in karst terrains – review of impacts on karst aquifer ecosystems from temperate and Mediterranean ecoregions.* I International Conference on Research for Sustainable Development in Mountain Regions. Braganza, Portugal. 3 - 5 October.

posters

5. Mostaza, D. *Effects of agriculture in the hydrology of an alluvial aquifer: differences between groundwater exploited and induced infiltration area.* 2016 Watershed Technology Conference. Quito, Ecuador. 3-9 December.

6. Passoni, A., Vighi, M., Davoli, E., Fanelli, R., Bagnati, R. *Automated online-SPE-HPLC/MS analysis of dithianon in water 34th IMMS.* Informal Meeting on Mass Spectrometry. Trento, Italia. 15 - 18 May.

7. Rasines-Ladero, R., Meffe, R., Carreño, F., Mostaza, D., Sundberg, A., Iepure, S. *Groundwater Biota diversity and distribution as indicator for the aquifer types and boundaries determination (Tajo River basin, Central Spain).* 21st Century Watershed Technology Conference and Workshop (2016). Quito, Ecuador. 3-9 December.

8. Rico, A., Van den Brink, P.J., Focks, A. *Disentangling the effects of multiple stressors in aquatic ecosystems: multivariate analysis of macroinvertebrate samples in the Danube River.* 1st GLOBAQUA International Conference. Freising, Alemania. 11 - 12 January.

9. Rico, A., Van den Brink, P.J., Focks, A. *Identification of relevant toxicant mixtures influencing the macroinvertebrate community of the Danube river.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

10. Rico, A., Zhao, W., Gillissen, F., Lürling, M., Van den Brink, P.J. *Effects of temperature, genetic variation and species competition on the sensitivity of algae populations to the antibiotic enrofloxacin.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

11. Vighi, M., Tremolada, P., Giacchini, R., Parenti, P., Benocci, R., Lupi, D. *Preliminary approach for the study of the effects of multiple stress factors on honeybees.* XXVI SETAC (Society of Environmental Toxicology and Chemistry) Europe Annual Meeting. Nantes, Francia. 22 - 26 May.

5.7. Patents

Granted patents

1. Salas, J.J., Pidre, J.R., Aragón, C.A., Esteve-Núñez, A., Tejedor, S., Berna, A., López-Martínez, G.F. Sistema bioelectroquímico para depurar aguas residuales con cátodo de esferas conductoras flotantes. ES2539510 A1. CENTA Foundation, IMDEA Water Institute, Joca Ingeniería and Construcciones, S.A. Date of grant: 05-05-2016.

2. De Miguel, Á. García-Calvo, E., De Bustamante, I., Lado, J.J. Proceso para el tratamiento de aguas procedentes de lodos bentonínitos. ES2548426 B1. IMDEA Water Institute. Date of grant: 18-07-2016.

Published patents

1. García, R., Molina, S., Landaburu, J., Ortíz de Lejarazu, A., Rodríguez, L., Rabadán, FJ., García Calvo, E. Proceso de transformación de membranas de poliamidad con enrollamiento en espiral que han agotado su vida útil en membranas de utilidad industrial. ES 2589151 A1. Applicant: Valoriza Agua, IMDEA Water Institute. Publication date: 11-11-2016.

patetents

fellowships

5.8. Fellowships

Lucía Freire Cordero
Category: R&D Technical support
Fund: Spanish Ministry of Economy and Competitiveness

Lucía Nieto Reyes
Category: Researcher support
Fund: Community of Madrid

Andrea Castaño Sánchez
Category: Researcher support
Fund: Community of Madrid

Marta Vivar García
Category: Researcher from National Science Programme Juan de la Cierva
Fund: Spanish Ministry of Economy and Competitiveness

Beatriz Peinado Rodríguez
Category: Laboratory Technician
Fund: Spanish Ministry of Economy and Competitiveness

Amaia Ortiz de Lejarazu Larrañaga
Category: Research support
Fund: Spanish Ministry of Economy and Competitiveness

Ascensión López Vargas
Category: Research support
Fund: Spanish Ministry of Economy and Competitiveness

Patricia García Doncel
Category: Research support
Fund: Spanish Ministry of Economy and Competitiveness

PhD thesis

5.9. PhD Thesis

PhD thesis defended

1. Impact on groundwater as a result of the use of reclaimed water for irrigation in Gran Canaria. Spain. February 2016.
Esmeralda Estévez Navarro

2. Hidrogeological operation in the Moya and Azuaje ravines area, north of Gran Canaria. February 2016.
M.ª Pilar Hernández Quesada

3. Novel bioelectrochemical approaches for exploring extracellular electron transfer in Geobacter sulfurreducens. May 2016.
Marta Rosa Estévez Canales

4. Bioelectrochemically-assisted remediation: a novel strategy for cleaning-up polluted soils. June 2016.
Ainara Domínguez Garay

5. Physiological and operation strategies for optimizing Geobacter-based electrochemical systems. June 2016.
Zulema Borjas Hernández

6. Merging Microbial Electrochemical Systems with Conventional Reactor Designs for Treating Wastewater. December 2016.
Sara Tejedor Sanz

PhD thesis in progress

1. Development of low cost equipment for monitoring photovoltaic systems based on open-hardware and open source tools
Ascensión López Vargas

2. Microbial Electrochemical Technologies applied to waste water treatment
Colin Wardman

3. Nanostructured materials with biocidal effect for improving the efficiency of water use in the fruit and vegetables industry
Georgiana Amariei

4. Hydraulic engineering applied to Roman minin, study of the ruin montium system
Juan José Castro Ríos

5. **Hydrogeological study, availability and groundwater quality in the Sama basin, Tacna, Perú**
Jacquelyne del Rosio Chagua Flores

6. **Fouling and biofouling resistant membranes for water treatment processes**
Berta Díez Odriozola

7. **Analysis of water needs in different components of the river ecosystem for the definition of ecological flows regimes**
Ana María Fernández Santamarina

8. **Physical and toxicological interactions between anthropogenic pollutants and engineered nanoparticles**
Idoia Martín de Lucía Ramos

9. **The groundwater in the karstic system of the Nor Yauyos Cochas reserve**
Fluquer Peña Laureano

10. **Bioelectroventing: cleaning-up polluted sites using electrodes to stimulate microbial remediation activities**
José Fernando Rodrigo Quejigo

11. **Nanofiltration and ultrafiltration membranes from end-of-life reverse osmosis membranes. A study of recycling**
Raquel García Pacheco

12. **Microcrustaceous of the hyporheic interfaze/aquifers associated to the Tajuña and Henares rivers (Jarama's watershed): Bio- indicators of the ecological quality of groundwater**
Rubén Rasines Ladero

13. **Toxic cyanobacteria from freshwater systems. Molecular methods for their biological control**
M.ª Ángeles Lezcano Vega

14. **Methodology for the inventory of Hydrosites and their application in the Biosphere Reserve of the Sierras de Béjar y Francia (Salamanca)**
Alberto Blanco González

15. **Development of biological control technologies for cyano-HABs and elimination of cyanotoxins**
Jesús Morón López

16. **Photovoltaic-photochemical systems for water treatment**
Natalia Pichel Mira

17. **Comprehensive study of land application systems: Comparative between two pilots**
Adrián Pérez Barbón

18. **Wastewater treatment through the use of electrogenic wetlands with electroactive biochar as a biofilter substrate**
Amanda Prado Nicolás

19. **Study of the interaction between surface and subterranean waters in the groundwater body (GWB) "Aluviales: Jarama-Tajuña" (030.007)**
David Mostaza Colado

20. **Assessment of the vulnerability of aquatic ecosystems to multiple stressors in the Mediterranean area**
Alba Arenas Sánchez

internships

5.10. Internships

Student: Antonio López Nicolás
Research: Economic and institutional analysis
Centre: Universitat Politècnica de Valéncia
Date: 1-29 February

Student: Carlos Gutiérrez Martín
Research: Economic and institutional analysis
Centre: Universidad de Córdoba
Date: 8-12 February

Student: Tiziana di Lorenzo
Research: Groundwater ecology
Centre: Institute of Ecosystem Study, CNR (Italy)
Date: February 29 – March 3 and October 17 – November 7

Student: Martina Reisner
Research: Water and Energy
Centre: University of Applied Sciences Upper Austria.
Date: April 3 – June 15

Student: Angelika Basch
Research: Water and Energy
Centre: University of Applied Sciences Upper Austria.
Date: 7 – 19 April

Student: Vanessa Arévalo Seijas
Research: Ecotoxicology
Centre: Universidad Peruana Cayetano Heredia
Date: May 9 – July 22

Student: Olga Patricia Gómez Rojas
Research: Water laboratory
Centre: Universidad Pedagógica y Tecnológica de Colombia
Date: September

5.11. RTD activities organization

1. VI Conference "With Science in School 2016". Círculo de Bellas Artes. 9 and 10 March:
- "The water under our feet: Is there life underground?".
- "Drop by drop your food runs out".

2. Workshop "Sparkling Bacterias". Educational Enrichment Programme for Students with High Capacities (PEAC) of the Comunity of Madrid. Madrid. 12 March.

3. 2ª Meeting of TRAGUANET Network. IMDEA Water. Alcalá de Henares, Madrid. 16 March.

4. Official presentation of Forum on Water Economics. Directed by Gonzalo Delacámara (academic director, IMDEA Water) and José Carlos Díez Alcalá University, Madrid. 4 April.

5. 1st Forum on Water Economics Water and Sustainability. Madrid. 8 April.

6. Workshop "Meet the MET", Infoday Marie Sklodowska-Curie & Meet the Fellows 2016 (H2020). Madrid. 22 April.

7. Information Day "How can I fund my R+D+i projects?", Madrid Activa and University of Alcala. IMDEA Water. 18 May.

8. Electricity-producing bacteria to rescue. Pint of Science "Bioelectricity and stone in the building". Madrid. 25 May.

9. Forum on Ecosystem-based Management (freshwater, coastal and marine ecosystem). AQUACROSS Project. IMDEA Water. Alcalá de Henares, Madrid. 27 and 28 June.

RTD activities organization

10. 2nd Forum on Water Economics. Madrid. 7 July.

11. European Researchers' Night 2016. 30 September:

- "The water below your feet: aquifers and underground caves".
- "Super-microbes from freshwater".
- "How do we use the energy from the sun?".
- "Desalination world: hand-made and recycled membranes".
- "Sporty Science or "Sciencefull" Sport".

12. III Simposium about water management in protected areas. Sanz, J. member of the Technical Secretary. IMDEA Water, CNAP and IGME. Cuba. November.

13. XVI Science Week, 7 - 20 November:

- "Green filters: A different way of wastewater treatment. From waste to resource".
- "Groundwater and its fauna".
- "Water supply in Madrid: El Atazar dam".
- "Electricity-producing bacteria: an old and new form of energy".
- IMDEA Water collaborate in "All risk X: live together with geological disasters", IGME, Segovia.

14. 3rd Forum on Water Economics. Madrid. 24 November.

15. I Workshop IBERIMET. University of Alcala, Alcalá de Henares, Madrid. 15 and 16 December.

institutional activities

6

6.1. Awards and Merits **[80]**

6.2. Collaboration **[80]**

6.3. Other Institutional Activities **[83]**

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6.1. Awards and Merits

- Rico, A. Best Paper Award published by the scientific journal Environmental Toxicology and Chemistry, Society of Environmental Toxicology and Chemistry (SETAC). XXVI Anual Meeting SETAC, Nantes, France. 22 - 26 May. Paper "Evaluating aquatic invertebrate vulnerability to insecticides based on intrinsic sensitivity, biological traits, and toxic mode of action". Andreu Rico and Paul J. Van den Brink. DOI: 10.1002/etc.3008.

- Fernández Rubio, R. "Honorary Member of the Specialized Group of Mineral Resources and Reserves" by the "Superior Council of Associations of Mining Engineers" and "National Association of Mining Engineers". 8 June.

- Pérez Blanco, C.D. UAH Extraordinary Doctorate Award, course 2013-2014. 13 June.

- Awards ceremony XI Premios Madri+d. Accésit to European Proyect iMETland (A new generation of Microbial Electrochemical Wetland for effective decentralized wastewater treatment), for Best European Cooperation R&D project. 29 June.

6.2. Collaboration

With Research Organizations

1. Universidad de Alcalá
2. Universidad Rey Juan Carlos
3. Gobierno de España · Ministerio de Medio Ambiente y Medio Rural y Marino · Conferencia Hidrográfica del Duero
4. centa
5. FCIHS
6. Universidad de Jaén
7. Gobierno de España · Ministerio de Economía y Competitividad · Instituto Geológico y Minero de España
8. Centro para el Conocimiento del Paisaje
9. Instituto Madrileño de Investigación y Desarrollo Rural, Agrario y Alimentario · Consejería de Economía e Innovación Tecnológica · Comunidad de Madrid

10. UNIPAZ Instituto Universitario De La Paz
11. ECOVIDA Centro de Investigaciones y Servicios Ambientales
12. IÑALES
13.
14. CIDERH
15. CNAT
16.
17.
18. Cinara
20. ufisa
21. c@map.ca colaborativa geomática

With Companies

1. Sadyt
2. eurosestudios

3. DAM Depuración de Aguas del Mediterráneo
4. JOCA
5. EDASU
6. PERGA INGENIEROS, S.L.
7. caasa tecnología del agua
8. EUROCONSULT
9. Consulnima Consultoría e Ingeniería Ambiental
10. GRUPO SOIL
11. aqualia
12. Wasser
13. Valoriza Agua
14. SULZER
15. innovati Innovación y Creatividad en TI

Member of

1. Renewable Heating & Cooling European Technology Platform
2. geoplat
3. INIA
4. AEDyR Asociación Española de Desalación y Reutilización
5. Plataforma Tecnológica Española del Agua
6. water footprint network
7. ASERSA
8. Madrid Network
9. afre Asociación de Fabricantes para Agua y Riego Españoles
10. IWA International Water Association
11. Medio Ambiente
12. netwerc H2O
13. WssTP The European Water Platform
14. EUMED professionals & experts consortium
15. iah aih
16. QWi Water is our concern

6.3. Other Institutional Activities

- Member of Human Resources Strategy Group (European Commission). Euraxess Rights.

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

- Participation. XVI Science Week. Madrid, Spain. 2016

- Member of Euraxess Service Network. Local Contact Point

- Participation. Blog el agua. Madri+d. REMTAVARES Project.
  http://www.madrimasd.org/blogs/remtavares/

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