

imdea water institute

institute dea water

annual report









foreword

foreword



Eloy García Calvo Director, IMDEA water Institute April 2015

annual report

Having finished the alterations in the definitive IMDEA Water premises, we were able to, at long last, make our eager move to the new building halfway through 2015. It has marked the beginning of a new stage for our institute.

Having new areas available has allowed us to extend our activity in all ways. The number of researchers (predoctoral and PhD researchers) has grown more than any of the previous 4 years. Now there are 45. Most importantly, we have started to grow and hope to continue growing in forthcoming years.

The larger number of researchers has come hand-in-hand with more activity in international projects, all of which are European, three of which have been led by our institute. The activity of contracting technical support has also grown, with some highly relevant institutions like the European Parliament or the Directorate-General for Environment of the EU.

We continue generating and registering patents; one of which has been approved and three others have been published, a fifth has been presented and three others are being prepared. Of those that have been published, an international one has led to a technology-based company (TBC) which has many chances of undertaking wastewater treatment activities in small towns. Given the probability of this TBC's internationalisation, we have extended the international patent to the USA, Mexico and Australia.

Having more space has also enabled us to organise our infrastructures to treat the wastewater that we generate with our own technologies, for which we will use microbial electrochemical technologies and land application systems.

Our infrastructures are completed with the building of an experimental station to allow the creation of a very useful mesocosms for the ecotoxicology group, which was added to our institute at the end of 2015, and which we hope will lead to productive synergies for other research groups, both internal and external.

We will continue with our training activities by coordinating a Master degree in two versions, face-to-face and semi-virtual learning, for Latin American students. We also continue to coordinate a PhD programme in collaboration with the University of Alcalá and the Rey Juan Carlos University. Training is completed with our researchers participating in 10 Master degrees in different institutions, and by tutoring end of degree/master projects, etc.

Our researchers have undertaken cooperation activities in the Sahara and in places that have suffered natural disasters, like the Philippines and Nepal. They have also collaborated with different NGOs.

Finally, we continue with our diffusion by transmitting to society the importance of water and how to act in relation to the resource is a task that requires everyone's involvement, as well as that of an Institute like IMDEA Water.

Once again, I wish to thank all our institute members for their involvement and patience in complex times, such as our move. Despite all the difficulties, and thanks to everyone collaborating, our institute's activity did not suffer.

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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.

IMDEA Water's remit is to guide water problems along the path of research and education; to serve as a fundamental scientific resource and voice of authority on water issues in the region and the country; to prepare students to develop the next generation of leaders in water-related questions; to become a national model as a successful water research centre and provide recognition, visibility and resources to the Institute and the people and organisations involved with it.



Photo 1. 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

ELECTIVE TRUSTEES (INSTITUTIONAL MEMBERS)

University of Alcala. Alcala de Henares. Madrid. Spain

Pending appointment

Rey Juan Carlos University. Madrid. Spain

Pending appointment

Complutense University. Madrid. Spain

Pending appointment

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



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 31/12/2015

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

iMETIand 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). iMETIand 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. 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 have 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.









Midea water



2.1.3. Red Nacional de tecnología electroquímicas microbianas national network of microbial electrochemical technologies. IBERIMET

http://www.imetland.eu

The recent discovery of microorganism 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.



2.1.4. 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.





2.1.5. Research of Treatment Reuse and Control Technologies for the Sustainability of the Wastewater Treatment: Integrated Research about Sustainable Island (IISIS) http://www.iisis.es

The goal of the project IISIS assimilates the latest architectural trends based on biomimicry to give a step in the challenge of building sustainable environments. A strict balance with ecological conservation, sustainability and sustainable energy and resources is maintained in any moment. On this purpose the project will employ marine renewables especially designed for use on the island, complete water treatment and waste control designed to fulfil the goal of zero discharge, improve performance and optimize the operation of the island through a combination of new bioclimatic configurations adapted to local conditions produced in the marine environment where they take place.

2.1.6. Wastewater treatment in second generation bioelectrogenic wetlands: The "Smart" Wetlands (SMART WETLAND)

Project funded by the INNPACTO program (2012-2015) which aims to incorporate microbial electrochemical technologies for natural treatment systems for wastewater treatment in small populations.

2.1.7. Elimination of sulfate in water by bioelectrogenic methods (BIO-SO4)



Project funded by the INNPACTO program (2012-2015) which aims to apply microbial electrochemical technologies to reuse brackish water with high sulfate content.





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



REMTAVARES 3 will be 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.



2.1.9. Meeting Microbial Electrochemistry for water (MEET-ME4water)

http://www.eip-water.eu/MEET_ME4WATER

MEET-ME4WATER will focus on overcoming the barriers to scale-up and demonstration of microbial electrochemical technologies (METs) and bring them faster to market. These technologies treat waste water and, at the same time, produce value added products (chemicals, H2, and/or desalinate water at zero energy cost simultaneously) whilst producing energy. METs have a well explored innovation potential for sustainable development of waste water treatment systems. Further work is needed to fully control the engineering and biotechnological aspects of these systems at larger scale.

2.2. Reclaimed Water Reuse



2.2.1. Water Reuse: beyond the Royal Decree 1620/2007 (REAGUA2)

This research project considers two regeneration technologies for treated wastewaters based on ground application, they are crop irrigation and horizontal reactive beds (permeable reactive barriers, PRBs). The first case includes irrigation systems for some crops with environmental and economic value (forage grasses and species for bio-fuel production), where the regeneration medium will be formed by the plant, the soil, and the non-saturated zone. In the other case, the regeneration medium will be formed by a PRB, the soil and the non-saturated zone (NSZ).

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.



Objectives

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. Economic and Legal Analysis of drinking water and sanitation service regulation

- Analysis of international agreements on international trade and legal protection of foreign investment in water resources, rights and uses of local population and drinking water and sanitation supply.
- Analysis of factors driving the industrial structure of drinking water and sanitation (W&S) services.







2.3.3. "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.

We have identified four directions for actions;

- To develop DSS tools to identify and assess the cost and benefits of riverrestoration projects, informing and facilitating decision-making, as well as the implementation and monitoring of the restoration measures.
- To act as a think tank regarding public participation and communication in river restoration in order to identify the barriers that stand in the way of implementing these types of projects, to help identify the right tools, incentives and strategies needed, not only to overcome them but also to involve stakeholders in all stages (design, execution and monitoring).
- To test and demonstrate these DSS Tools, by applying them in specific river restoration projects in demonstration sites in what we call RiverRes Living Labs, located in different European countries.
- The last action is targeted to knowledge sharing and capacity building, particularly with the DSS tools developed.

2.3.4. 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 a 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.

2.5. Water and Mining

2.5.1. 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.

2.6. Groundwater Ecology

2.6.1. 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.

2.6.2. 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.

2.7. Cyanobacteria and Cyanotoxins

The increasing occurrence of cyanobacteria due to eutrophication and decreasing of inland water quality pose a global concern. The group of cyanobacteria and cyanotoxins at IMDEA water focuses their R&D activities to offer technology-based solutions to water-based industries in relation to CyanoHABs (Cyanobacterial Harmful Algal Blooms).

In our research activities, we combine traditional microbiology tools together with modern molecular, chemical and analytical techniques on a holistic approach to tackle the problem of over-growth of cyanobacteria and their toxins.

Currently we are focused on:

- 1. Designing monitoring programs for the development of toxic cyanobacteria blooms in reservoirs.
- 2. Developing technology for the specific and sensitive detection of microcystins in water.
- 3. Developing technology for the efficient and low-cost removal of microcystins during water treatment using biofilms.

Moreover we offer the following services:

- · Cyanotoxin analysis.
- qPCR analysis for the detection and quantification of potential toxin-producing cyanobacteria.
- Eutrophication assessment by nutrient analysis.

2.8. Climate Change

2.8.1. 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.



FACCEIP



2.8.2. 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.









2.9. 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.

2.10. 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.
- 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.



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2.11. 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.

2.12. Water and Energy



2.12.1. Solar Photovoltaics

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.



2.12.2. 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

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

malfunction 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.

2.12.3. 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 development 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.

2.12.4. Energy and Water at the Indigenous Communities of Oaxaca (Mexico): Demand, local resources and potential solutions

Project funded by the University of Jaén within the framework of the 'International Projects for Development Cooperation' Programme.

The main objective is to study and understand the water and energy requirements from the indigenous communities of Oaxaca (Mexico), analysing the available local resources, including both water and energy. Quality and quantity will be assessed, and potential solutions to satisfy the local demand will be proposed according to the identified needs, local resources and cultural constraints.

The project will also reinforce the local infrastructures and capabilities at the Autonomous University of 'Benito Juárez' in Oaxaca (Mexico), by acquiring new equipment (weather station to measure renewable energy resources), improving the recently created 'Water Analysis' lab, and providing specific training in water and energy related issues.





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Contracts















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EUROPEAN PARLIAMENT. Multiple framework service contract in five lots for provision of

Evaluation support (through reports, studies, seminars...) of costs and benefits of actions and politics related with climate change.

- **Canal de Isabel II Gestión.** Analysis of emerging contaminants in different Drinking Water Treatment Stations (DWTS).
- Amec Foster Wheeler Environment & Infraestructure UK Limited. Decision making framework for water resources management plans for the English Environment Agency
- **Gas Natural SDG, S.A.** 2015 UN-Water Annual International Zaragoza Conference. Water and Sustainable Development: From Vision to Action. 15-17 January 2015.
- **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
 - Analysis of the potential for growth and job creation through the protection of water resources, pack 2. (GROWTH 2)
 - Support to the various Water Framework Directive Common Implementation Strategy (CIS) Groups WG Economics, WG Water Accounts
- MedTrends Future Trends in the Mediterranean Sea. Med Programme-EC European territorial cooperation 2007-2013 - WWF España http://www.medtrends.org/
 - Ilustrating the most probable integrated scenario of marine economic growth in the Mediterranean European countries for the next 20 years and assessing potential consequences on Good Environmental Status objectives set under the Marine Strategy Framework Directive.

- 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.
- ABENGOA WATER COMPANY
 - Design and construction of hollow fiber membrane distillation modules (HOFI-Modules).
 - Design, construction and operation of a hollow fiber membrane distillation pilot plan (HOFI-MED-PLANT).



Figure 2. Countries collaborating in projects and contracts

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h u m a n r e s o u r c e s



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annual report

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 the 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 n°6 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 Letón 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.



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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 journal "Water and Desalination Research Journal" and member of the editorial board of the Journals: "Desalination", "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).

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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.

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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 11 communications at several national and international conferences. She has published 10 articles in indexed journals and a book chapter of molecular biorecognition.

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 Indenyldialkil- 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: Membrane Technology.



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 TRANS-FOMEM (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 TRANS-FOMEM

(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.



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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 Rev 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.



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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. He 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 2005. Her research focuses mainly in the field of Hydrogeology of volcanic soil, but she has also conducted studies on the stratigraphy and sedimentology of the detrital formation of Las Palmas. 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.

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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. Ángel de Miguel García Researcher

PhD in Hydrology and Water Resources Management by the University of Alcalá in November, 2013. His doctoral thesis was "The water footprint as Impact Indicator: Application to the Duero Basin and the Spanish Pork Sector". Degree in Environmental Sciences and Master's degree in Hydrology and Water Resources at Alcalá University and a postgraduate course in Geographic Information System at UPM. He has worked in the chemical engineering and analytical chemistry department water reusability through non conventional technologies, within the project CONSOLIDER-Tragua CSD2006-00044.

His main area of research is the Water Footprint, applied to the Water Resources Planning processes and to the Sustainability Assessment. He also develops several works in the field of Water Reuse, primarily intended for agricultural uses and groundwater recharge. He also works on the implementation and improvement of several nonconventional technologies of Wastewater Treatment, mainly Plant Application, being an active member of FILVER. He participates in several public and private projects in the fields above mentioned. He has 3 indexed publications as well as

several non-indexed journal articles and contributions to books.

He belongs to the ERU WATSAN ERU (Red Cross), conducting operations to supply and purification of water in emergency situations, and he is a board member of the National Association GN Environment.



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.

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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.

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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

Graduated in Biochemistry in 1995 from the University of Murcia, Spain. He carried out his doctoral research on biodegradation of explosives in the El Zaidin Experimental Station (CSIC) and received his Ph.D. degree in Biochemistry in 2000 from the University of Granada, Spain, obtaining the Outstanding Doctorate Award. He spent his first Postdoctoral period (4 years) in the Environmental Biotechnology Centre (Massachusetts, US) investigating different aspects of microbial iron reduction. Then, he joined the Astrobiology Centre (CSIC-INTA) in Madrid (3 years) to provide insights into the exocellular electron transfer in electricity-producing bacteria.

As of 2009 he is a Researcher with the Ramón y Cajal National Science Programme at the Department of Analytical Chemistry and Chemical Engineering of the University of Alcalá, Madrid.

He is currently leading a research group into the microbial production of electricity, a novel process that merges biotechnology with renewable energies, with applications in the field of wastewater treatment, in situ bioremediation and nanobiotechnology. At IMDEA Water, he is leading the research focused on the molecular and bioelectrochemical aspects of microbial fuel cell technology in wastewater treatment.





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 lepure 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. lepure 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. 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



Dr. Andreu Rico Artero Researcher

microbial electrochemical technology,

formerly in FCC Aqualia S.A. as

"Project Manager" at Innovation

and Technology Department,

and currently at Environmental

Abraham Esteve-Nuñez). He is

author of various scientific papers

and more than 20 communications

patents related to water technologies.

Among his professional and scientific

in international conferences and

workshops, and co-author of 2

interests: Bioelectrochemical

Desalination systems, New

concepts, and low-energy

production of drinking water.

Engineering, Water technology,

technology and electrochemical

developments based on membrane

technologies for water treatment and

Biotechnology Research Group of

IMDEA Water (Principal Investigator:

Andreu Rico holds a BSc in Agricultural Engineering (graduated with honours) and a higheducation 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.



M^a Ángeles Lezcano Vega Predoctoral Researcher

Degree in Environmental Sciences from Autonoma 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 Sevilla University, Sevilla, Spain. MSc:Molecular Genetics and Biotecnology Research: Toxic Cianobacteria in fresh water reservoirs



Zulema Borjas Hernández Predoctoral Researcher

Degree in Biotechnology from Francisco de Vitoria University, Madrid. Spain. MSc in Hidrology and Water Resources Management at Alcalá University and Rey Juan CArlos University, Madrid. Spain Research: Development of microbial desalination cells.

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.

Alba Arenas Sánchez Predoctoral Researcher

Degree in Environmental Science at Autonoma 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.







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 Foundation 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.

Midea water 2015



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 Predoctoral Researcher

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.



Estefanía Ibáñez Moreno Predoctoral Researcher

Degree in Environmental Sciences from Alcalá University. Madrid. Spain.

MSc in Contemporary Latin America and relations with the European Union: a strategic cooperation from the University of Alcalá. Madrid. Spain. Research: Economic instruments 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 vears 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.



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Mdea water



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 photovoltaicphotochemical-thermal hybrid systems, clean water photovoltaic sensors for solar disinfection.



laboratory technicians

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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



Degree in Chemistry at the University of Alcala







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management area and administration

Rafael Irastorza Vaca

Manager

Juana Sanz García

R&D Management

María Luz Barquilla Crespo Accountant Technician

José Ángel Gómez Martín Technology transfer technician

Degree in Economic Sciences.

PhD in Environmental Sciences.

Degree in Economic Sciences.

lechnology transfer technicia

Degree in Environmental Sciences.







Celia Barral Nieto Technician in Administration and Finance









infrastructures and scientific equipment



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annual report

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
- $\cdot\,$ 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

- Gas x Gas Equipment /MS (CG x CG/TOF). Consisting of a Gerstel Twister brand autosampler, MultiPurpose Sampler model 2XL and Pegasus System GCxGC TOF-Mass model 7890 A GC System from Agilent Technologies.
- Gas Chromatography / Triple Quadrupole equipment CG/MS/MS(QqQ), model 7890A GC System. Triple quadrupole detector model 7000 (Agilent Technologies).
- Liquid Chromatography /Triple TOF (LC-QTOF) equipment. Triple TOF 5600 model (AB sciex).
- Liquid Chromatography /MS (LC-TOF) equipment (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).



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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, Alphalmager, 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.



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

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.

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annual report

5.1. Scientific Papers

5.1.1. Articles in journals

1. Borjas, Z., Ortiz, J.M., Aldaz, A., Feliu, J.M., Esteve-Núñez, A. (2015) Strategies for reducing the start-up operation of Microbial Electrochemical Treatments of urban wastewater. Energies, 8 (12). pp. 14064-14077.

2. Carbajo, J.B., Perdigón-Melón, J.A., Petre, A., Rosal, R., Letón, P., García-Calvo, E.(2015) Personal care product preservatives: Risk assessment and mixture toxicities with an industrial wastewater. Water Research, 72. pp. 174-185. ISSN 00431354.

3. Carbajo, J.B., Petre, A., Rosal, R., Herrera, S., Letón, P., García-Calvo, E., Fernández-Alba, A.R., Perdigón-Melón, J.A.(2015) Continuous ozonation treatment of ofloxacin: Transformation products, water matrix effect and aquatic toxicity. Journal of Hazardous Materials, 292. pp. 34-43. ISSN 03043894.

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5. De Miguel, Á., Hoekstra, A.Y., García-Calvo, E. (2015) Sustainability of the water footprint of the Spanish pork industry. Ecological Indicators, 57. pp. 465-474. ISSN 1470160X.

6. De Miguel, Á., Kallache, M., García-Calvo, E. (2015) The Water Footprint of Agriculture in Duero River Basin. Sustainability, 7 (6). pp. 6759-6780. ISSN 2071-1050. 7. Estévez-Canales, M., Berná, A., Borjas, Z., Esteve-Núñez, A.(2015) Screen-Printed Electrodes: New Tools for Developing Microbial Electrochemistry at Microscale Level. Energies, 8 (11). pp. 13211-13221.

8. Estévez-Canales, M., Kuzume, A., Borjas, Z., Füeg, M., Lovley, T., Wandlowski, T., Esteve-Núñez, A. (2015) A severe reduction in the Cytochrome C content of Geobacter sulfurreducens eliminates its capacity for extracellular electron transfer. Environmental Microbiology, 7 (2). pp. 219-226.

9. Fernández, V., Khayet, M. (2015) Evaluation of the surface free energy of plant surfaces: toward standardizing the procedure. Frontiers in Plant Science, 6. ISSN 1664-462X.

10. García-Pacheco, R., Landaburu, J., Molina, S., Rodríguez-Sáez, L., Teli, S.B., García-Calvo, E.(2015) Transformation of end-of-life RO membranes into NF and UF membranes: Evaluation of membrane performance. Journal of Membrane Science, 495. pp. 305-315. ISSN 03767388.

11. Gonzalo, S., Rodea-Palomares, I., Leganés, F., García-Calvo, E., Rosal, R., Fernández-Piñas, F.(2015) First evidences of PAMAM dendrimer internalization in microorganisms of environmental relevance: A linkage with toxicity and oxidative stress. Nanotoxicology, 9 (6). pp. 706-718. ISSN 1743-5390 03767388.

12. González-Naranjo, V., Boltes, K., De Bustamante, I., Palacios, M.P. (2015) Environmental risk of combined emerging pollutants in terrestrial environments: chlorophyll a fluorescence analysis. Environmental Science and Pollution Research, 22 (9). pp. 6920-6931. ISSN 0944-1344.

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14. Martínez-Hernández, V., Meffe, R., Herrera, S., Arranz, E., De Bustamante, I. (2015) Corrigendum to "Sorption/desorption of non-hydrophobic and ionisable pharmaceutical and personal care products from reclaimed water onto/ from a natural sediment" Sci Total Environ 472 (2014) 273–281. Science of The Total Environment, 505. pp. 1232-1233. ISSN 00489697.

15. Pérez-Blanco, C.D., Delacámara, G., Gómez, C.M. (2015) Water charging and water saving in agriculture. Insights from a Revealed Preference Model in a Mediterranean basin. Environmental Modelling & Software, 69. pp. 90-100.

16. Pérez-Blanco, C.D., Gómez, C.M., Delacámara, G. (2015)Revealing the willingness to pay for income insurance in agriculture. Journal of Risk Research, n° ahead of print, 1-21.

17. Petre, A., Carbajo, J.B., Rosal, R., García-Calvo, E., Letón, P., Perdigón-Melón, J.A. (2015) Influence of water matrix on copper-catalysed continuous ozonation and related ecotoxicity. Applied Catalysis B: Environmental, 163. pp. 233-240. ISSN 09263373.



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19. Qin, L., Wang, Y., Vivar, M., Huang, Q., Zhu, L., Fuentes, M., Wang, Z. (2015) Comparison of photovoltaic and photocatalytic performance of non-concentrating and V-trough SOLWAT (solar water purification and renewable electricity generation) systems for water purification. Energy, 85. pp. 251-260. ISSN 03605442.

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21. Quirós, J., Boltes, K., Aguado, S., Guzmán, R., Vilatela, J.J., Rosal, R. (2015) Antimicrobial metal–organic frameworks incorporated into electrospun fibers. Chemical Engineering Journal, 262. pp. 189-197. ISSN 13858947.

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23. Quirós, J., Gonzalo, S., Jalvo, B., Boltes, K., Perdigón-Melón, J.A., Rosal, R. (2015) Electrospun cellulose acetate composites containing supported metal nanoparticles for antifungal membranes. Science of The Total Environment. ISSN 00489697. Midea water 2015

24. Vicente-Serrano, S., Cabello, D., Tomás-Burguera, M., Martín-Hernández, N., Beguería, S., Azorín-Molina, C., Kenawy, A. (2015) Drought Variability and Land Degradation in Semiarid Regions: Assessment Using Remote Sensing Data and Drought Indices (1982– 2011). Remote Sensing, 7 (4). pp. 4391-4423. ISSN 2072-4292.

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5.1.2. Other articles

1. Bacchetti, T., Barroeta, B., Esteve-Núñez, A. (2015) La columna bioelectrogénica: una herramienta para introducir conceptos de ecología microbiana y electroquímica en la educación secundaria. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 12 (3). pp. 529-535. ISSN 1697-011X.

2. Campos, R., Barrios, I., Lillo, J.(2015) Experimental CO2 injection: Study of physical changes in sandstone porous media using Hg porosimetry and 3D pore network models. Energy Reports, 1. pp. 71-79. ISSN 23524847.

3. Fuentes, M., Vivar, M., Aguilera, J., Vacas, J.A. (2015) Diseño de un data logger de bajo coste usando Arduino. Aplicación para la monitorización de sistemas fotovoltaicos cumpliendo el estándar IEC. Parte II. SolarNews, 56. pp. 14-16. ISSN 1699-8405.

4. Lado, J.J., Pérez-Roa, R.E., Wouters, J.J., Tejedor-Tejedor, M.I., Federspill, C., Anderson, M.A. (2015) Continuous cycling of an asymmetric capacitive deionization system: An evaluation of the electrode performance and stability. Journal of Environmental Chemical Engineering, 3 (4). pp. 2358-2367. ISSN 22133437 (SNIP): 1.054. 5. Magdaleno, F., Delacámara, G. (2015) Las Medidas Naturales de Retención de Agua: del diseño a la implementación a través de proyectos europeos. Natural Water Retention Measures (NWRM): from design to Implementation through European Projects. Ingeniería Civil (179). pp. 131-138. ISSN 0213-8468.

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7. Pascual, J., Udaondo, Z., Molina, L., Segura, A., Esteve-Nuñez, A., Caballero, A., Duque, E., Ramos, J.L., Van Dillewijna, P. (2015) Draft Genome Sequence of Pseudomonas putida JLR11, a Facultative Anaerobic 2,4,6-Trinitrotoluene Biotransforming Bacterium. Genome Announcements, 3 (5).

5.1.3. Books

1. Castro, J.J., De la Cruz, J., Delgadillo, A., Chagua, J., Moreno, C., De Rojas, C., Sandino, L.M.L (2015) Proyectos 2015 - Máster Universitario en Hidrología y Gestión de los Recursos Hídricos. Instituto IMDEA Agua.

2. Pascual, J.A., Sanz, J.M., De Bustamante, I. (2015) Aplicaciones de la geomática en el estudio del patrimonio del agua. Cuadernos de Geomática (3). IMDEA AGUA, Centro para el Conocimiento del Paisaje, Alcalá de Henares. ISBN 978-84-606-6758-2.

5.1.4. Books Chapters

1. Cabrera, M.C., Cruz, T., Mendoza, V., Palacios, M.P. (2015) Estudio, aprovechamiento y gestión del agua en terrenos e islas volcánicas. In: II Workshop. Editorial Instituto Geológico y Minero de España y AIH-Grupo Español. ISBN 978-84-938046-4-0, pp. 85-92.

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2. De Miguel, Á., Meffe, R., Leal, M., González-Naranjo, V., Martínez-Hernández, V., Lillo, J., Martín, I., Salas, J.J., De Bustamante, I. (2015) Tratamiento de aguas residuales procedentes de un edificio de oficinas mediante un filtro verde intensivo. In: Estudios en la zona no saturada. Universidad de Alcalá, Alcalá de Henares, pp. 155-158. ISBN 978-84-16133-91-8.

3. Delacámara, G., Gómez, C.M. (2015) Water Trading: An Introduction. In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 201-208.

4. Delacámara, G., Gómez, C.M., Maestu, J. (2015) Water Trading Opportunities and Challenges in Europe. In: Routledge Handbook of Water Economics and Institutions. Routledge Books, pp. 281-293. ISBN 978-0-415-72856-0.

5. Delacámara, G., Pérez-Blanco, C.D., Ibáñez, E., Gómez, C.M. (2015) Water Trading in the Tagus River Basin (Spain). In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 249-264.

6. Essalhi, M., Khayet, M. (2015) Fundamentals of Membrane Distillation. In: Pervaporation, Vapour Permeation and Membrane Distillation: Principles and Applications. Elsevier. ISBN 978-17824242246.

7. García-Fernández, L.; Khayet, M. (2015) Membranes used in Membrane Distillation: Preparation and Characterization. In: Pervaporation, Vapour Permeation and Membrane Distillation: Principles and Applications. Elsevier. ISBN 978-1782424222464.

8. Gómez, C.M., Delacámara, G., Maziotis, A., Mysiak, J., Lago, M. (2015) Key Conclusions and Methodological Lessons from Application of EPIs in Addressing Water Policy Challenges. In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 393-416. 9. Gómez, C.M., Delacámara, G., Pérez-Blanco, C.D., Rodríguez, M. (2015) Voluntary Agreement for River Regime Restoration Services in the Ebro River Basin (Spain). In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 365-378.

10. Lago, M., Mysiak, J., Gómez, C.M., Delacámara, G., Maziotis, A. (2015) Defining and Assessing Economic Policy Instruments for Sustainable Water Management. In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 1-14.

11. Maestu, J., Gómez, C.M., Green, C. (2015) Economic Development. In: The United Nations World Water Development Report 2015: Water for a Sustainable World. UNESCO, Paris, pp. 23-27. ISBN 978-92-3-100071-3.

12. Martínez-Hernández, V., Meffe, R., Segura, R., De Bustamante, I. (2015) Modelización del transporte del antibiótico sulfametoxazol durante su infiltración a través de la zona no saturada. In: Estudios en la zona no saturada. Estudios en la Zona No Saturada., XII. Universidad de Alcalá, Alcalá de Henares, pp. 165-171. ISBN 978-84-16133-91-8.

13. Meffe, R., De Miguel, Á., Sánchez Ruano, L., Martínez-Hernández, V., Leal, M., Lillo, J., De Bustamante, I. (2015) Soil amendments using poplar woodchips: an effective strategy for the removal of wastewater-originated contaminants? In: Estudios en la zona no saturada. Universidad de Alcalá, Alcalá de Henares, pp. 149-153. ISBN 978-84-16133-91-8.

14. Mysiak, J., Gómez, C.M. (2015) Water Pricing and Taxes: An Introduction. In: Use of Economic Instruments in Water Policy. Insights from International Experience. Global Issues in Water Policy (14). Springer International Publishing, pp. 15-20. **Mdea water**

15. Sánchez, O., Garrido, L., Arencibia, L.F and Mas, J., Palacios, M.P. (2015) Molecular Characterization of Biofilms Developing in Drip Irrigation Systems Operating with Reclaimed Water in Gran Canaria (Spain). In: Technology, Management and Efficiency. Series: Environmental Remediation Technologies, Regulations and Safety. Nova Science Publishers. ISBN 978-1-63463-771-8.

5.1.5. Scientific-Technical Reports

1. Delacámara, G., Ibáñez, E., Prada, C., Rodríguez, M. *El crecimiento azul, un reto para el Mediterráneo y golfo de Cádiz.* Technical Report. WWF-España. 015.

2. Norton, M., McCord, J., Delacámara, G., Kirhensteine, I., Hughes, C., Fawcett, C., Pastor, J., Suclla, J and Helmbrecht, J., García, M.A and Pedro, G., Gonzales, M.E. *Hydro-Economical Analysis and Prioritisation of Water Resources Initiatives in Peru.* Technical Report. 2030 Water Resources Group (The World Bank). 2015.

3. Ryan, S., Carter, C., Delacámara, G., Ferrini, S. *Decision making for water resource management.* Technical Report. Environment Agency (UK), UK. 2015.

4. Strosser, P., Delacámara, G., Hanus, H., Williams, H. *A guide to support the selection, design and implementation of Natural Water Retention Measures in Europe. Capturing the multiple benefits of nature-based solutions.* Manual. Publications Office of the European Union. 2015.

5.2. Lectures

5. De Miguel, Á., García-Pacheco, R. *Actividad de sensibilización acerca de la unidad de emergencia ERU WATSAN de Cruz Roja Española.* 9^a Semana de la Solidaridad. Universidad Carlos III. Madrid. 23 - 26 March.

6. Sanz, J.M., EURAXESS Rights - Logo HR Excellence in Research. Caso de éxito de IMDEA Agua. Seminario Red EURAXESS. Bilbao. 4 May.

7. Fuentes, M. *Building Integration Hybrid PV: Optima Project.* Photovoltaic integrated with water or buildings, Series International Seminar - Experts of Introducing Talents Base. APSEC. Tianjin, China. 11 - 12 September.

8. Vivar, M. *Hybrid Solar Photovoltaic-Photochemical Systems for Water Disinfection and Electricity Generation.* Photovoltaic integrated with water or buildings, Series International Seminar - Experts of Introducing Talents Base. APSEC. Tianjin, APSEC. Tianjin, China. 11 - 12 September.

9. Sanz, J.M., *EURAXESS Rights - Logo HR Excellence in Research. Caso de éxito de IMDEA Agua.* Seminario Red EURAXESS. Sevilla. 6 October.

10. Esteve-Núñez, A., *Microbial electrochemical technologies: a new paradigm for treating wastewater.* Workshop Bio-electric light, EXPO Milano 2016. 18 October.

11. El-Shehawy, R. *Water and Biology: Smart Technological Solutions*. I Conferencia IMDEA. Ciencia, Empresa y Sociedad. Madrid. 6 November.

12. Esteve-Núñez, A. *Aplicación de la Bioelec-trogénesis al tratamiento de las aguas residuales urbanas.* Curso "Tratamiento de aguas residuales en pequeñas aglomeraciones urbanas en la CAPV: teoría, investigaciones y aplicaciones". CENTA y Aguasresiduales.info. Bilbao. 17 and 18 November.



13. lepure, S. *Ecotoxicological risks assessment* of pharmaceuticals from urban and hospital wastewater on aquatic ecosystems. Escuela de tecnologías avanzadas de tratamiento de aguas residuales. REMTAVARES. Madrid. 26 November.

14. Ortiz, J.M. *Tecnologías Electroquímicas Microbianas aplicadas a la depuración de aguas residuales urbanas.* Escuela de tecnologías avanzadas de tratamiento de aguas residuales. REMTAVARES. Madrid. 26 November.

15. lepure, S. *Preliminary results of pharmaceutical compounds ecotoxicity on target freshwater species.* Workshop "Nuevas soluciones tecnológicas para el tratamiento de aguas residuales con contaminantes prioritarios y emergentes". REMTAVARES. Madrid. 27 November.

16. Molina, S. *Estudio preliminar para la modificación de membranas recicladas*. Workshop "Nuevas soluciones tecnológicas para el tratamiento de aguas residuales con contaminantes prioritarios y emergentes". REMTAVARES. Madrid. 27 November.

17. Rosal, R. *Electrospun membranes incorporating antimicrobial functionality.* Workshop "Nuevas soluciones tecnológicas para el tratamiento de aguas residuales con contaminantes prioritarios y emergentes". REMTAVARES. Madrid. 27 November.

participation in scientific committees

5.3. Round Tables

1. García-Calvo, E. *Retos de la investigación y la innovación en explotación, gestión y gobernanza de acuíferos en situaciones de uso intensivo y con consumo de reservas*. Workshop "La explotación intensiva de reservas de agua de acuíferos en España: retos y soluciones tecnológicas para su gestión eficiente". Aqualogy. Madrid. 21 April.

2. De Bustamante, I y Del Villar, A. Seminario sobre las Alianzas Público Privadas en América Latina y su Importancia para los Objetivos de Agua y Saneamiento. Organized by IMDEA Water and the Institute of Latin American Studies (IELAT) - UAH. Alcalá de Henares. 25 June.

 Esteve-Núñez, A. Mesa Temática Interregional Red I+D+i en Agua en el Parque Científico de Murcia. Organized by Red I+D+i. Murcia. 25 June.

4. Esteve-Núñez, A. *Las tecnologías electroquímicas microbianas aplicadas al tratamiento de las aguas residuales.* Jornada "Vanguardias en ciencia y tecnología para la innovación en la gestión del agua". AEAS (Asociación Española de Abastecimiento de Agua y Saneamiento). Madrid. 21 and 22 September.

5.4. Participation in Scientific Committees

1. De Bustamante, I. Expert of the advisory board of ENMRI (Environment and Natural Materials Research Institute) at City of Scientific Research and Techological Applications (SRTA-CITY). Since June 2015.



5.5. Oral Communications

1. Esteve-Núñez, A. *Microbial Wonderfuel Cells: from nano-metre to cubic-metre.* Workshop. 5th Dissemination Workshop of the Nano4water cluster. Barcelona. 19 and 20 January.

 Esteve-Núñez, A. Bacterias electroactivas o la deconstrucción de la "cocina" redox. IV Ciclo de Conferencias Ciencias. Córdoba. 26 March.

3. García-Pacheco, R. *Evaluation of the ppm-h* concept to transform end-of-life RO membrane into recycled NF and UF membranes. World Congress and Expo on Recycling, Barcelona. 20 - 22 July.

4. Molina, S., García-Pacheco, R., Rodríguez-Sáez, L., García-Calvo, E., Campos, E., Zarzo, D., González-Campa, J., Abajo, J. *Transformation of end-of-life RO membrane into recycled NF and UF membranes, surface characterization*. International Desalination Association World Congress on Desalination and Water Reuse 2015. San Diego, CA, United States. 30 August - 3 September.

5. Esteve-Núñez, A. *Microbial wonderfuel cells: From nano-meter to cubic-meter.* ismet2015, the 5th International Meeting on Microbial Electrochemistry and Technologies. Tempe, United States. 1 - 4 September.

6. Ortiz, J.M., Borjas, Z., Rogalla, F., Esteve-Núñez, A. *Microbial Desalination Cell operation: start-up protocol and batch mode analysis.* Ismet 2015, The 5th International Meeting on Microbial Electrochemistry and Technologies. Tempe, United States. 1 - 4 September.

7. Tejedor-Sanz, S., Ortiz, J.M., Berná, A., Letón, P., Esteve-Núñez, A. Integration of electrochemical techniques for a complete treatment of industrial wastewater: electrocoagulation plus microbial electrochemical fluidized bed reactors. Ismet 2015, The 5th International Meeting on Microbial Electrochemistry and Technologies. Tempe, United States. 1 - 4 September. 8. Meffe, R., De Bustamante, I. *Review on the occurrence of emerging organic contaminants and pesticides in Italian surface water and groundwater.* 42nd IAH Congress (International Association of Hydrogeologists). Roma, Italia. 13 - 18 September.

9. De Miguel, Á., Meffe, R., Leal, M., González-Naranjo, V., Martínez-Hernández, V., Lillo, J., Martín, I., Salas, J.J., De Bustamante, I. *Tratamiento de aguas residuales procedentes de un edificio de oficinas mediante un filtro verde intensivo.* XII Jornadas de Investigación en la Zona No Saturada (ZNS'15). Alcalá de Henares. 18 - 20 November.

 Martínez-Hernández, V., Meffe, R., Segura, R., De Bustamante, I. Modelización del transporte del antibiótico sulfametoxazol durante su infiltración a través de la Zona No Saturada. XII Jornadas de Investigación en la Zona No Saturada (ZNS'15). Alcalá de Henares. 18 - 20 November.

11. Meffe, R., De Miguel, Á., Sánchez-Ruano, L., Martínez-Hernández, V., Leal, M., Lillo, J., De Bustamante, I. *Soil Amendments Using Poplar Woodchips: An Effective Strategy for the Removal of Wastewater-Originated Contaminants?* XII Jornadas de Investigación en la Zona No Saturada (ZNS'15). Alcalá de Henares. 18 - 20 November.

12. Ortiz, J.M., Borjas, Z., Rogalla, F., Esteve-Núñez, A. *Microbial desalination cells: wastewater treatment coupled to freshwater production.* European Fuel Cell Technology & Applications Conference - Piero Lunghi Conference. Nápoles, Italia. 16 - 18 December.





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5.6. Posters

1. Boltes, K., Puna, Á., Letón, P., Esteve-Núñez, A., Salas, J., Pidre, J., Nozal, L. *Devel*opment of Microbial Electrogenic Technologies for removal of emerging pollutants from wastewater. SETAC Europe 25th Annual Meeting. Barcelona. 3 - 7 May.

2. lepure, S., Wysocka, A., Sarbu, S.M., Namiotko, T. Homeomorphy in subterranean Candoninae: Geometric morphometrics of the valve shape and molecular phylogenetic approaches applied for a new species from a chemoautotrophically based Movile Cave ecosystem. 8th European Ostracod Meeting. Turku, Estonia. 22-30 July.

3. Mostaza Colado, D. *Estudio de los factores ambientales y la evolución hidrogeológica de la Masa de Agua Subterránea (MAS) 030.007 en la zona de la finca La Isla (Arganda del Rey, Madrid).* Diffusion poster about Smart-Hydro Project. V Jornadas Doctorales de la Universidad de Castilla La Mancha. Ciudad Real. 6 October.

4. Rivas Tabares, D.A., De Miguel, Á., Meffe, R. *Preliminary hidrological water resources assessment of the Cega-Eresma-Adaja watershed using SWAT model.* International SWAT Conference. Cerdeña, Italia. 22 – 26 June.

5.7. Patents

Granted patents

1. Inventors: Salas, J.J., Pidre, J.R., Aragón, C.A., Esteve-Núñez, A., Tejedor, S., Berna, A., Pastor, L. Procedimiento para la eliminación bacteriana de nitrato en aguas residuales y sistema biológico electrogénico. ES2539416 A1. Applicant: CENTA Foundation, IMDEA Water Foundation, DAM Depuración de Aguas del Mediterráneo. Date of grant: 23-12-2015.

Published patents

1. Inventors: 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. Applicant: CENTA Foundation, IMDEA Water Institute, JOCA Ingeniería y Construcciones, S.A. Publication date: 01-07-2015.



3. Inventors: De Miguel, Á. García-Calvo, E., De Bustamante, I., Lado, J.J. Proceso para el tratamiento de aguas procedentes de lodos bentonínitos. ES2548426 A1. Applicant: Fundación IMDEA Agua. Publication date: 16-10-2015.

Register of Intellectual Property

1. Inventors: Vivar, M., García Pacheco, R., De Miguel, Á., Fuentes, M., Aguilera, J. Gestión de un sistema híbrido fotovoltaico-eólico-diésel de generación de energía para plantas potabilizadoras móviles en situaciones de emergencia con carga continua, 24h de operación y uso nocturno sin generador diésel. M-004232/2015. Applicant: IMDEA Water Foundation. Submission Date: 18-06-2015 Concession date: 14-12-2015.

2. Inventors: Del Villar, A., Nortes, D. Herramienta para el análisis y previsión de la demanda y precios de los servicios del agua para usos urbanos. M-006665/2015. Applicant: IMDEA Water Institute and University of Alcala (UAH). Submission Date: 02-10-2015. Concession date: 02-10-2015.

5.8. Fellowships

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

fellowships



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2. The behaviour of pharmaceuticals in unsaturated zone. July 2015. Cum Laude

M.ª Virtudes Martínez Hernández

3. Emerging pollutants in wastewater: Aquatic Toxicity and Ozonation. September 2015. Cum Laude

José Benito Carbajo Elena

4. The role of evapotranspiration in water resources management: local measurements and regional estimates. October 2015 Cum Laude.

Alberto de Tomás Calero

5. Quanawat in Alcalá de Henares October 2015. Cum Laude Enrigue Fernández Tapias

6. Electrospun fibers containing metal-releasing particles for microbial growth control. November 2015. Cum Laude

Jennifer Quirós Jiménez

7. The challenge of water and energy services efficient management, the edge of a problem. A view from Dominican Republic. December 2015. Ojilve Ramón Medrano Pérez

8. Support system to Hidraulic Heritage decisionmaking (SADP-Water): Aplication to Horta Sud of Valencia. December 2015. Cum Laude. Reynaldo Payano Almánzar

PhD thesis in progress

1. Membrane Technology Raquel García Pacheco

2. 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

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

4. Development of microbial desalination cells Zulema Borjas Hernández

5. Methodology for the inventory of Hydrosites and their application in the Biosphere Reserve of the Sierras de Béjar y Francia (Salamanca)

Alberto Blanco González



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

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

9. Photovoltaic-photochemical systems for water treatment Natalia Pichel Mira

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

11. Wastewater treatment by microbial electrogenesis process

Sara Tejedor Sanz

12. Wastewater treatment through the use of electrogenic wetlands with electroactive biochar as a biofilter substrate

Amanda Prado Nicolás

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

14. Assessment of the vulnerability of aquatic ecosystems to multiple stressors in the Mediterranean area

Alba Arenas Sánchez

5.10. Internships

Student: Azurra Lentini Research: Microcontaminants. Date: 12 - 19 March

Student: José Luis Corvea Porras Research: Wastewater management in protected áreas. Centre: Centro Nacional de Áreas Protegidas, Havana, Cuba Date: 12 May - 5 June

Student: Emily Welsch Research: Microcontaminants Centre: University of Calgary. Canada Date: 19 May - 12 June

Student: Reynaldo Payano Almánzar Research: Hidraulic Heritage Centre: Amphos. Santiago de Chile Date: 8 June - 3 July

Student: Mariela Cruz Padilla Research: Water and Energy Centre: Universidad Autónoma Benito Juárez de Oaxaca. Mexico Date: 16 November - 18 December

Student: Arlette Sánchez Pérez Research: Water and Energy Centre: Universidad Autónoma Benito Juárez de Oaxaca. Mexico Date: 16 November - 18 December.





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5.11. RTD activities organization

1. Workshop. "New sources: Wastewater reuse in the framework of sustainable management", 2015 UN-Water Annual International Zaragoza Conference. Water and Sustainable Development: From Vision to Action. Zaragoza. 14 January.

 II Workshop "Estudio, aprovechamiento y gestión del agua en terrenos e islas volcánicas".
 Las Palmas de Gran Canaria. 21 - 23 January.

- 3. Researcher's Night 2015, 25 September:
 - "Science in emergencies".
- "Life in water through the microscope: toxic cyanobacteria".
- "The underground aquatic ecosystems The Final Frontier".

4. XV Science Week, 2 - 15 November. Activities:

 "Main Control Centre and the installation of hydroelectric microturbines of Canal Isabel II Gestión in Majadahona". "Membrane Technology: preparation and recycling. An eco solution to face water scarcity"
"Electricity-producing bacteria: an old and new form of energy".

Also collaboration in the following activity:

 "Working for the Earth: How to study groundwater?". Organized by the Rey Juan Carlos University.

5. Kick-off meeting of iMETIand project in IMDEA Water. 5-6 November.

- 6. "Assessment Framework" of Aquacross project. WP3 meeting. Alcalá de Henares. 16 and 17 November.
- 7. Conference "Advanced technologies of wastewater treatment". REMTAVARES Consortium. Madrid. 26 November.

8. Workshop "New technology solutions for the treatment of wastewater containing priority and emerging pollutants". REMTAVARES Consortium. Madrid. 27 November.



institutional activities



- 6.1. Awards and Merits [75]
- 6.2. Collaboration [75]
- 6.3. Institutional Activities [78]

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6.1. Awards and Merits

- Eloy García Calvo was appointed Corresponding Member of the Spanish Royal Academy of Pharmacy. Madrid. 12 February.
- "Honorable Mention to Public-Private Cooperation with Marketed Research Results" to the consortium IMDEA Water, Euroestudios, DAM, JOCA and CENTA Foundation for the project AQUAELECTRA. X Madri+d Awards. Madri+d Foundation.
- "HR Excellence in Research" Award from the European Commison. Brussels, 3 March.
- Awards ceremony X Premios Madri+d.
 Diploma to Eloy García Calvo. Fundación Madri+d. 22 de abril.

6.2. Collaboration

With Research Organizations

^{1.} Universidad de Alcalá











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With Companies



3. Depuración de Aguas del Meditemánaco





 Madrid Network
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1. Renewable Heating & Cooling

European Technology Platform

geoplar

AEDyR

ASOCIACIÓN ESPAÑOLA DE DESALACIÓN y REUTILIZACIÓN

6.3. 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. XV Science Week. Madrid, Spain. 2015



 Member of Euraxess Service Network. Local Contact Point



 Participation. Blog el agua. Madri+d. REMTAVARES Project.

http://www.madrimasd.org/blogs/remtavares/





editor imdea water institute

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