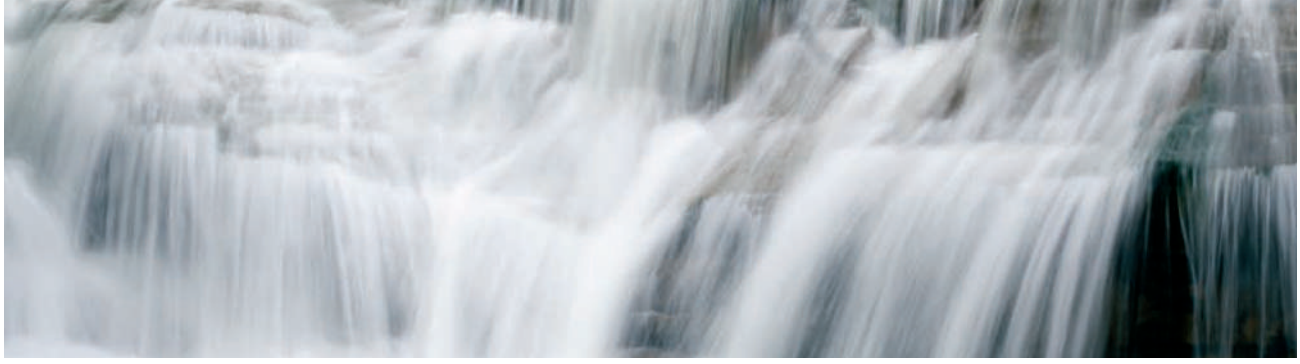


imdea water institute

just **water**

institute
imdea
water

annual report 2014

foreword

Eloy García Calvo
Director, IMDEA water Institute
April 2015

annual report
2014

This year 2014 is one of transition for IMDEA Water. Acquisition of the new building in late 2013 was accompanied by all the administrative tasks involved in carrying out the refurbishment, which was completed by the end of last year. We hope to be able to settle into the new building definitively by mid-2015.

Although difficulties in stabilising staffing levels unfortunately led to three of our researchers leaving, a postdoctoral researcher and two PhDs have taken their place. Among the additions to our team are three senior technicians to take charge of handling complex analytical equipment. This way, the laboratories are organised and run to provide service to the Institute's researchers or outside applicants without neglecting the scientific activity previously carried out with this equipment.

Execution of projects throughout the year remained stable and the Institute was active in thirteen international, national and regional projects. There was also a significant increase in the number of research contracts with national and international institutions, both public and private. Notably among the international institutions, the framework agreements reached with the Environment DG of the European Commission or the World Bank.

In terms of scientific output, there was a slight increase in the number and a higher impact factor in journals where the Institute's research has been published. Patents also continue to be presented, in this case a Spanish Patent.

We should also emphasise the great increase in the number of invitations to conferences and round tables where researchers from IMDEA Water took part.

Throughout the year, special efforts have been made to encourage participation in the initial tenders for Horizonte 2020. To this end, 5 projects are pending assessment in several tenders, one of them co-ordinated by our Institute.

In the training area, we continue to participate in the organisation of a master's course and a doctoral degree programme. In particular, in response to the great demand for training coming from Latin America, for 2014 the first edition of an official blended learning Masters course in semi-distance format, with the physical attendance component taking place in Lima.

Finally, I must thank all members of the Institute, and in particular those working on the coordination of projects and contracts, for their enormous endeavours in a year calling for special effort due to the novel nature of the tenders. I would also like to express our gratitude to our associate researchers for their commitment to ensuring that the scope of IMDEA Water's activity continues to expand.

table of contents

table of contents

annual report

2014

overview

1

annual report

2014

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.

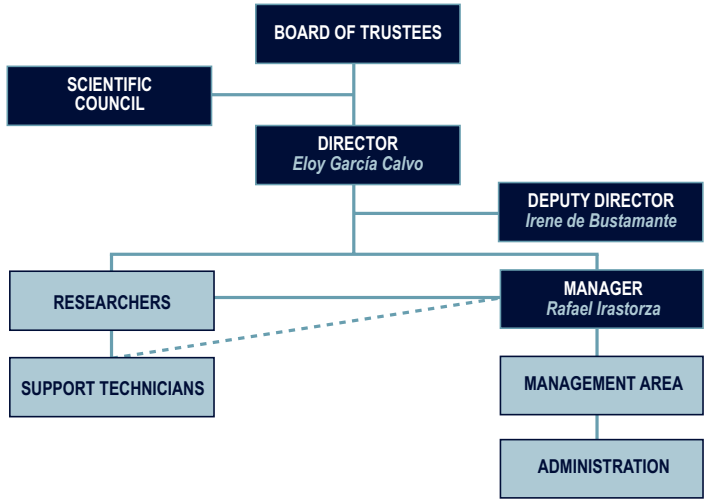


Figure 1. IMDEA Water management structure

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)

Mrs. Alicia Delibes Liniers
Regional Government Vice-Secretary for Education, Department of Education. Regional Government of Madrid, Spain
Vicepresident IMDEA-Water Institute

Mrs. Rocío Albert López-Ibor (january-november)
General Director of Universities and Research, Regional Board of Education, Youth and Sport, Regional Government of Madrid. Spain

Mrs. Lorena Heras Sedano (november-december)
General Director of Universities and Research, Regional Board of Education, Youth and Sport, Regional Government of Madrid. Spain

Mr. Juan Ángel Botas Echevarría
Subdirector General of Research. Directorate General of Universities and Research. Department of Education Regional Government of Madrid. Spain

Mrs. Beatriz Presmanes Arizmendi (january-october)
Chief of Research Programmes. Sub Directorate of Research, Regional Board of Education, Youth and Sport Regional Government of Madrid. Spain

ELECTIVE TRUSTEES (INSTITUTIONAL MEMBERS)

Mr. Juan José Vaquero
Full Professor of Organic Chemistry University of Alcala. Madrid. Spain

Mr. José Aguado Alonso
Full Professor of Chemical Engineering Rey Juan Carlos University. Madrid. Spain

Mr. José Luis Sotelo Sánchez
Full Professor of Chemical Engineering, Complutense University. Madrid. Spain

ELECTIVE TRUSTEES (PRESTIGIOUS SCIENTISTS)

Mr. Rafael Fernández Rubio
Institute of Engineering National Autonomous University of México (UNAM).
Director of the Division of Water Sciences, Secretary of the International Hydrological Programme (IHP). UNESCO

Mr. Marco Vighi
Department of Environmental Sciences and Territory. Faculty of Mathematical, Physical and Natural Science. University of Milano Bicocca. Italy
Member of the Scientific Committee on Health and Environmental Risk (SCHER) of the European Commission

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

Mrs. Blanca Elena Jiménez Cisneros
Institute of Engineering National Autonomous University of México (UNAM).
Director of the Division of Water Sciences and Secretary of the International Hydrological Programme (IHP) - UNESCO

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
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 Management. Madrid. Spain

ELECTIVE TRUSTEES (LOCAL ADMINISTRATION)

MUNICIPALITY OF ALCALÁ DE HENARES
Mr. Juan Jesús Domínguez Picazo. Councillor for Environment, Consumption and Waters, and Deputy Mayor of Alcalá de Henares City Council. Alcalá de Henares. Madrid. Spain

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

Mrs. Blanca Elena Jiménez Cisneros
Institute of Engineering National Autonomous University of Mexico (UNAM)

Mr. Marco Vighi
Department of Environmental Sciences and Territory (DISAT). Faculty of Mathematical, Physical and Natural Science. University of Milano Bicocca. Italy
Member of the Scientific Committee on Health and Environmental Risk (SCHER) of the European Commission

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

research

annual report 2014

Projects

2.1. Urban and Industrial Wastewater Treatment

2.1.1. 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.

2.1.2. 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.

2.1.3. 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.

2.1.4. Technology research for treatment, reuse and control for future sustainability in water treatment (ITACA)

The principal aim is the investigation of new industrial and urban technologies of waste water treatment that allow, in an efficient and sustainable way, to turn the process of current treatment into a strategy for the reutilization, the utilization of substances, by-products and residues and the energetic valuation, minimizing, the impacts on the natural environment.

Inside the project scope there is also included the parallel investigation of advanced systems of measurement, automation and control of the processes of treatment and valuation, which guarantee the achievement of a system of centralized management which resolves, in an automatic and autonomous way, the sequence and control of new effluent treatment being studied.

2.1.5. 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.

2.1.6. 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, advanced oxidation and chemical processes) and testing the ecotoxicological effects of pharmaceutical compounds on surface and groundwater crustaceans.

2.1.7. EIP_Water 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. Groundwater

2.3.1. Transboundary Waters Global Environment Assessment Programme. (TWAP)

http://www.geftwap.org/

TWAP aims at conducting the first global baseline assessment of transboundary water systems. The assessment will be carried out in five components: (i) Transboundary Aquifers and Small Island Developing States Groundwater Systems, (ii) Transboundary River Basins, (iii) Transboundary Lake Basins, (iv) Large Marine Ecosystems and (v) the Open Ocean

Transboundary water systems extend across or beyond national boundaries. They include about 455 aquifers, more than 1600 lakes and reservoirs and 276 rivers. In addition to the freshwater systems, transboundary waters also include the open ocean and 55 large marine ecosystems (LMEs) collectively covering almost 70% of the Earth's surface.

The wellbeing and socioeconomic development of a significant part of the world's population depends on these transboundary water systems, and the essential ecosystem goods and service they provide -- including freshwater for domestic, industrial and agricultural use; fisheries, tourism, transportation, water assimilation and climate regulation. Undeniable trends, however, indicate that a growing human population and its activities as well as a changing climate are modifying these systems at an increasing rate.

2.4. Microcontaminants

2.4.1. Nanoparticles and water quality (NANOAQUAL)

The environmental and health risks of nanotechnology and nanomaterials are still not well known, and even less in water than in the air. The reason is the lack of data on the evaluation, behaviour and transformation of these materials. It is necessary, now that there is still time, to carry out extensive research work to determine the risks of nanomaterials and the use of nanotechnology. Knowledge of the environmental behaviour of these substances will allow ways to reduce these risks to be found.

The overall aim of this project is to gain knowledge, for materials representing different families, on their behaviour in water, mobility and final destination, as well as the appropriate techniques for their neutralisation and/or removal. Therefore, we will be able to tackle the problems that will be generated when, in a not too distant future, production and massive use of nanomaterials lead to concentrations of these products in water that could cause concern.

2.5. Economic and Institutional Analysis

2.5.1. Integrated Water Resource Management – Economic and Legal Dimensions

- Modernisation of water management, regarding economic, legal and institutional aspects; specifically, use and water use rights markets, within a context of water economic scarcity and regulation of drinking water and sanitation services.
- Water conflict management

2.5.2. 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.

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

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

EIP Water Action Group
Pooling resources – Innovating water

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.

2.5.4. The transnationalization of local water battles: Water accumulation by agribusinesses in Peru and Ecuador and the politics of corporate social responsibility

This NWO-WOTRO programme investigates transnational processes of water resource accumulation and contamination by agri-business companies in arid areas in Ecuador and Peru, and explores the societal responses to such processes at diverse scales. Analysing the case of high-water-consuming crops (flowers, vegetables, fruits, and biofuels) the programme examines how globalizing water extraction and virtual water exports change existing labour- and property relations. It also investigates the strategies that local collectives devise to cope with this re-patterning of livelihoods. Given the fact that international consumers are steadily increasing the pressure to include 'the water issue' in fair and sustainable production trademarks, the programme also explores opportunities and perspectives for articulating the demands of local trade unions and water user collectives with international producer-consumer networks, fair trade and corporate social responsibility initiatives at diverse scales.

The programme's main research question is which strategies do local collectives in Peru and Ecuador devise to cope with the re-patterning of their livelihoods by globalizing water extraction and virtual water export, and what are their perspectives for articulating with consumer, fair trade and CSR initiatives, at diverse network scales.

2.6. Membrane Technology

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

LIFE TRANSFOMEM, project coordinated by IMDEA WATER, aims to test an innovative and environmentally-friendly recycling process for waste reverse-osmosis desalination membranes, currently landfilled, in order to produce lower pressure ultra-nanofiltration membranes 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. TRANSFOMEM is a European Community co-funding LIFE project with contract number LIFE13 ENV/ES/000751.

2.6.2. Fabrication, modification

and characterization The IMDEA Water membrane research group is also working on the fabrication, modification and characterization of different types of new-generation membranes (dense and porous), (hydrophobic and hydrophilic), (single-layer, thin film composite filled with different types of nanoparticles, graphene and carbon nanotubes),

(flat sheet, hollow fiber, nano-fibrous and nano-structured) for the separation processes, membrane distillation in all configurations (Direct Contact DCMD, Air Gap AGMD, Sweeping Gas SGMD and Vacuum VMD), direct osmosis (FO), reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF), microfiltration (MF) and pervaporation (PV) and for different environmental applications (Desalination, wastewater treatment).

2.7. Geothermal

IMDEA Water collaborates in the Spanish Geothermal Technology Platform (GEOPLAT), participating actively in different working groups: shallow geothermal, deep geothermal, geothermal resources research, regulatory framework and training. In addition, IMDEA Water is taking part in the Renewable Heating & Cooling European Technology Platform (RHC).

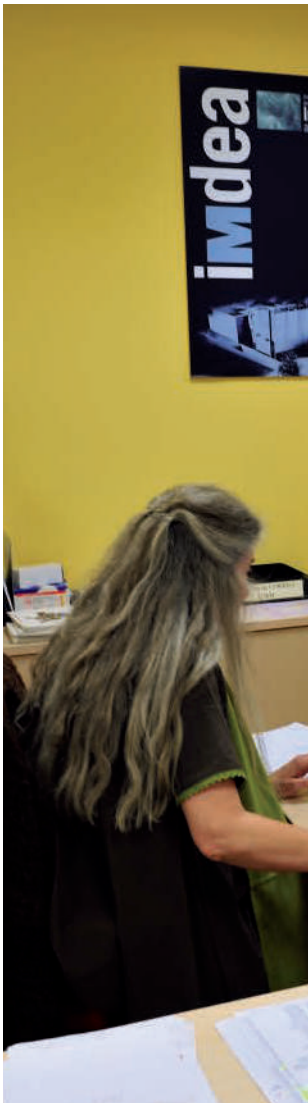
The Aim of IMDEA Water is to investigate geothermal energy from the point of view of water, because in all the different exploitation techniques for deep geothermal (flash plants, binary cycle plants, GS, etc.) and shallow geothermal (open loop, closed loop with heat exchanges etc.), water plays an essential role as vehicle for energy transport, with groundwater as the principal heat storage agent.

2.8. Water and Mining

2.8.1. 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.

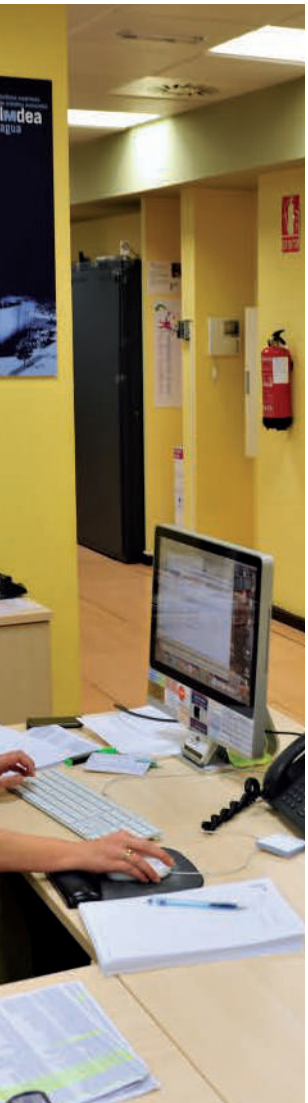
IMDEA Water has initiated two lines of work in the field of water and the mining industry: one in relation with the characterisation of the direct environmental impacts provoked by the mining industry, and another concerning water reuse and recycling for mining purposes.



2.9. Biological Indicators

2.9.1. Ecological assessment of groundwater ecosystems

This research line is focused on applingy the ecological criteria for an integrated assessment of groundwater ecosystems health, by using crustaceans as bioindicators. The research is carried out in the Jarama River basin (central Spain) and is oriented to the study of the groundwater communities both from the transitional hyporheic ecotone zone (highly susceptible to surface and groundwater pollution) and the shallow aquifers. We aim to investigate the role of the hyporheic zone as an intermediary transfer area of pollutants from the surface rivers down to the water table, and their effect on the hyporheic biota. This can be of further use to diagnose the cause of an prevailing impact and to provide an early warning signal of subsurface ecosystems decline. The results of the proposed research will also contribute to: i) highlighting the use of crustaceans communities as an alternative proxy to investigate surface water/ground water exchanges and ii) a better understanding of the hyporheic structure and function and its relation to the associated alluvial aquifers. Both facets are essential for the development of sustainable integrated water management strategies at the river basin level.



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

Delineation of the extent of hyporheic zone in river ecosystems is problematic due to the scarcity of spatial information about the structure of riverbed sediments and the magnitude and extent of stream interactions with the parafluvial and riparian zones. The several existing methods vary in both quality and quantity of information and imply the use of hydrogeological and biological methods. In the last decades, various non-invasive geophysical techniques were developed to characterize the streambed architecture and also to provide detailed spatial information on its vertical and horizontal continuity. This research topic is focused on delineating the lateral and vertical spatial extents of the hyporheic zone of Mediterranean rivers from central Spain by combining biological assessment of invertebrates with the near-surface images obtained by electrical resistivity tomography (ERT). Our research will 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.

2.9.3. Toxic cyanobacteria in fresh water reservoirs

The aim of this line of research is to tackle the problem of toxic cyanobacteria blooms in fresh water reservoirs. In our research activities, we combine traditional microbiology tools together with modern molecular and chemical techniques and we count on our extended network of collaboration both on the national and international levels. Currently, we are focused on four sub-lines:

1. Developing technology for the specific and sensitive detection of microcystins in water.
2. Developing technology for the efficient and low-cost removal of microcystins during water treatment.
3. Designing and tailoring monitoring programs for the development of toxic cyanobacteria blooms in reservoirs.
4. Analyzing the diversity and species dynamics of Microcystis sp. and co-existing biodegrading bacteria in Spanish water reservoirs.

2.10. Climate Change

2.10.1. 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. We also aim to assess the aquifers quality by using crustaceans as ecological indicators for groundwater ecosystem health.

smart-hydro

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

2.11. 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.

2.12. Hydraulic Heritage

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

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

2.13. 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.

2.14. Solar Phtovoltaics

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

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

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

UNIVERSIDAD DE JAÉN

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.

Contracts

- Framework Contract to provide services to support the development and implementation of EU Freshwater Policies" **DG ENVIRONMENT, (European Commission)**
  - EU-Level Instruments on Water Reuse
  - 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:**
  - 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.

- Alternativas de configuración para el montaje de una planta piloto destinada a la preparación de elixires acuosos de plantas medicinales. **HIRANYAGARBA, S.L.**

- The 2030 Water Resources Group (2030 WRG) **(IFC, World Bank Group)-WEF (World Economic Forum)** (Framework Contract 7172014)
  - Targeted Economic Analysis on Water Resources Management Issues
  - Hydro-economical analysis and prioritisation of water resource initiatives in Peru

- 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)

- Pilot project — Atmospheric Precipitation — Protection and efficient use of Fresh Water Integration on Natural Water Retention Measures in river basin management. **DG ENVIRONMENT, (European Commission)**

- Project: A Global Framework for Country Action. **FAO** Permanent Consultation Mechanism. Groundwater Governance

- Technical Support to INDRHI (Instituto Nacional de Recursos Hidráulicos de República Dominicana), Support to revision of the Water legislation and Formulation a new Water Lawl. **FAO**


J.P. SELECTA, s.a.
Made in Spain.
Fuse(A): 4
A: 2.7
V: 230
W: 640
Hz: 50
Cod: 7002431
Nº 4122

human resources

3

annual report 2014

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 nº6 of architecture and engineering), Coordinator of Technology Programme for the Environment of the Madrid Region and evaluator of scientific projects in the European Union, Hungary, Argentina and Spain (Galicia, Aragon, Basque Country). He has also published opinion articles in environmental and science newspapers.

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

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

Dr. Pedro León García
Associated Researcher

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

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

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

Dr. Roberto Rosal García

Associated Researcher

Master degrees with honours in Chemistry and in Business and a Ph.D. degree in Chemistry from the University of Oviedo with the 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 at the Department of Analytical Chemistry and Chemical Engineering of the University of Alcalá since 2003.

His scientific interests centre on chemical kinetics and catalytic processes with emphasis on the development of catalysts and the design and modelling of advanced oxidation processes.

He is also involved in the development of methods for assessing the ecotoxicology of emerging pollutants. He has participated in more than thirty financed research projects and R&D contracts and published over fifty scientific articles and book chapters.

Dr. José Antonio Perdigón Melón

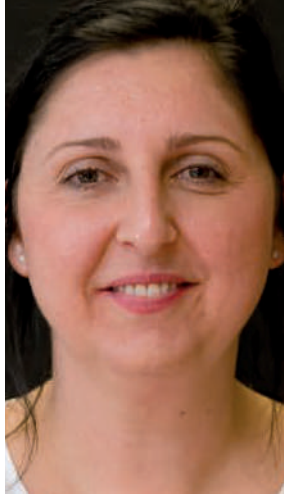
Associated Researcher

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 100 papers since 2000). He has filed 3 International Patents on the fabrication of polymeric membranes for water treatment. Recently, he has published 2 books. 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 supervises several research studies (9 Ph.D. thesis, 25 master thesis and undergraduate students. He is member of the European Desalination Society (EDS), the European Membrane Society (EMS) and the North American Membrane Society (NAMS). He has delivered over 40 oral presentations at national and international conferences on membranes and membrane processes and presented 30 posters. He gave various seminars in national and international Universities and Research centres and organized seminar cycles. He is currently member of the editorial board of the Journals: “Desalination”, “Applied Membrane Science & Technology”, “Membrane Water Treatment (MWT)”, “Membranes”, “Polymers”, “Applied Sciences” and “Journal of Materials Science and Nanotechnology”. He has recently received the prestigious “Prince Sultan Bin Abdulaziz International Prize for Water” (PSIPW, 5th edition, 2012) on Alternative Water Resources (Saudi Arabia) for his novel and creative work in membrane distillation (MD) technology that he has studied and promoted in all its theoretical and experimental aspects (from membrane synthesis to implementation).



Dr. Leonor Nozal Martínez

Associated Researcher

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

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

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

Dr. Alice Luminita Petre

Associated Researcher

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

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

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

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

Dr. Serena Molina Martínez

Researcher

She obtained her PhD by the Complutense University of Madrid. Her doctoral thesis, supervised by Prof. Javier de Abajo and Prof. José G. de la Campa, was presented in November 2012: "Preparation of porous membranes from hydrophilic aromatic polyamides. Evaluation as membranes for ultrafiltration and pervaporation operations". 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 diverse communications (6 oral / 4 poster) at several national and international conferences. She has published seven articles in indexed journals and a book chapter of molecular biorecognition.

Currently, she works at IMDEA Water carrying out morphological and spectroscopic characterization of polymeric membranes.

Dr. Julio José Lado Garrido

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

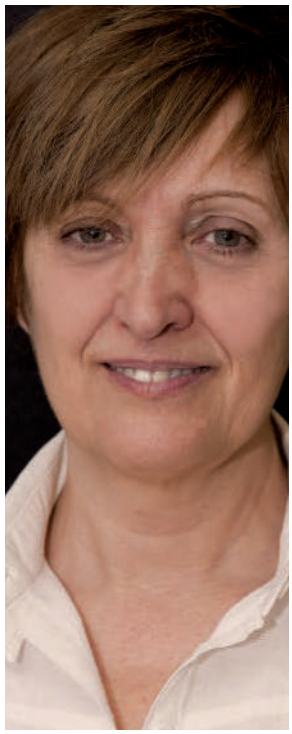
Degree in Chemical Engineering from Rey Juan Carlos University. Madrid. Spain.
MSc in Hidrology and Water Resources Management at Alcalá University, Madrid. Spain.
Research: Membrane Technology.

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 TRANSFOMEM (Transformation of disposed reverse osmosis membranes into recycled ultrafiltration and nanofiltration membranes).

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 180 papers in journals, books and papers, two patents (one licensed) and a software.

She has also directed 5 doctoral theses, licentiate 4 PhD and 25 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."

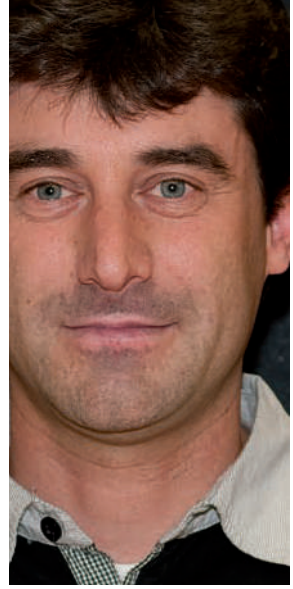
Dr. Francisco Javier Lillo Ramos

Associated Researcher

He graduated in Geology in 1985 from the University Complutense of Madrid and received the Diploma in Geological Engineering from the same University in 1985. He obtained a Ph.D in Earth Sciences from the University of Leeds (Britain).

He subsequently spent ten years working in the industry, mainly as field geologist for exploration and nuclear waste repository projects and for the Geological Map of Spain. In 1999, he joined the academic staff of the Rey Juan Carlos University, where he lectures in Geology and Hydrology and has been Head of the Geology Group since then. He was granted 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 39 papers in peer-reviewed international journals and has taken part in 16 research projects funded by public grants. Dr. Lillo has also collaborated in several projects with industry. His research is currently focused on environmental geochemistry, soil contamination by heavy metals, hydrochemistry and water quality, and reuse of treated waste waters in aquifer recharge.



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

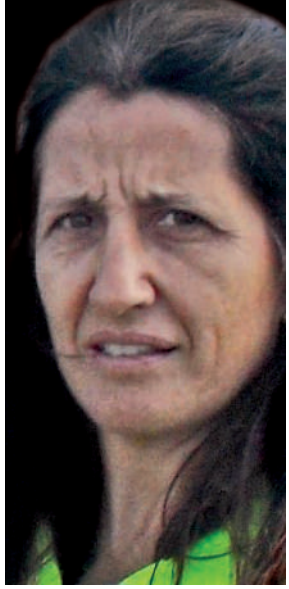
Graduated in Geological Science with specialization in hydrogeology at the University of Rome "La Sapienza" in 2007. During her master thesis, she carried out the characterization of a carbonatic aquifer to quantify the natural groundwater resource for a suitable drinking water management.

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 Pino Palacios Díaz

Associated Researcher

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

Dr. Lucila Candela

Associated Researcher

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

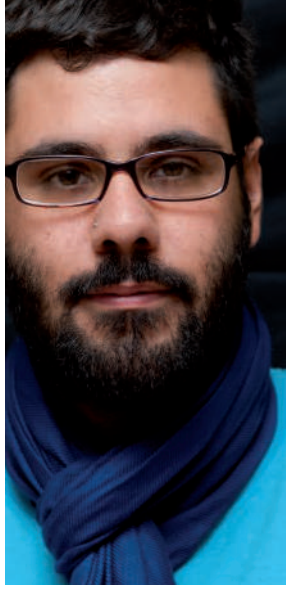
Dr. Ángel de Miguel García

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 non-conventional 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.

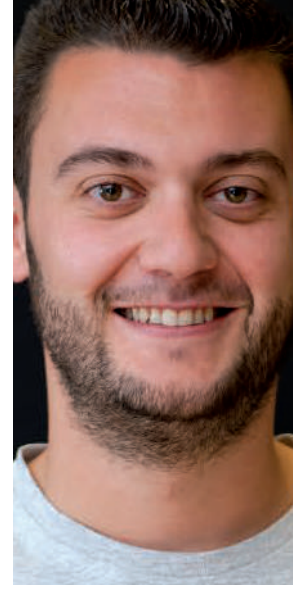


Dr. Víctor González Naranjo
Researcher

PhD. in Hydrology and Water Resources Management (2013, University of Alcalá, Spain). He did his PhD thesis on toxicity of organic contaminants (emerging and priority) mixtures in soil and water. Master's degree in Hydrology and Water Resources, Alcalá University and Rey Juan Carlos University (Madrid), in 2009-2010. Degree in Chemical Engineering at Las Palmas de Gran Canaria University (2003-2009). He has worked in the "Agronomy and Animal Pathology Departament" of Las Palmas de Gran Canaria University. He has participated within the project CONSOLIDER-Tragua CSD2006-00044, REAGUAM Project and REMTAVARES Project, working in water reuse for irrigation, principally in the effects of this practice on soils. Currently he is working at IMDEA-Water as a researcher.

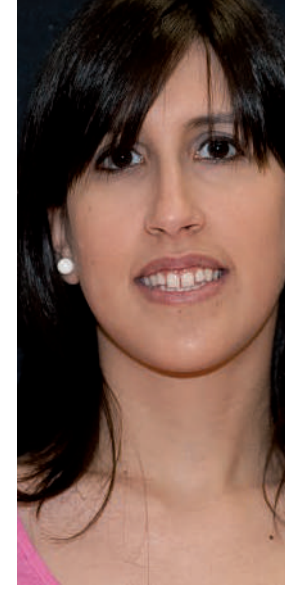
María Leal Meca
Predoctoral Researcher

Degree in Environmental Sciences from University of Rey Juan Carlos. Madrid. Spain.
MSc in Hydrology and Water Resources at Alcalá University and Rey Juan Carlos University. Madrid. Spain.
Research: Horizontal Permeable Reactive Barriers for groundwater recharge with treated wastewater.



Alberto Blanco González
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)



María de las Virtudes Martínez Hernández
Predoctoral Researcher

Degree in Environmental Sciences from Alcalá University. Madrid. Spain.
MSc in Hydrology and Water Resources at Alcalá University and Rey Juan Carlos University. Madrid. Spain.
Research: Emerging contaminants and groundwater.

water biology and bioelectrogenesis

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. He is also a member of the consortium responsible for the BACWIRE project (7FP) dedicated to improving the bacteria-electrode interaction by nanotechnology tools in order to make the waste-into-bioelectricity process a feasible application. 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 Iepure
Researcher

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

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

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

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

Dr. Karina Boltes Espínola
Associated Researcher

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

Dr. Tristano Bacchetti De Gregoris
Researcher

In 2005 he graduated in Tropical and Subtropical Agricultural Science and Technology, Florence University (Italy), with a thesis on the production of antibiotics from microalgae used in aquaculture and the effect of the bacteria associated with the algae on such production. In 2006 he moved to the Dove Marine Laboratory, Newcastle University (UK), to take up two consecutive positions as Junior Research Associate, for investigating quorum sensing and inter-species interaction among marine bacteria. After that, he received a Marie Curie Early Stage Training Fellowship in the Institute of Cell and Molecular Biosciences (UK) to perform mutagenesis of Bacillus subtilis in order to study the function of teichoic acids on the cell wall structure. In 2007 he began his Ph.D. in the Department of Marine Science and Technology, Newcastle University, to sequence the transcriptome of the crustacean Balanus amphitrite and to investigate the role of bacteria on the life cycle of this invertebrate. He was awarded with the Ph.D. in 2011 and shortly after he joined the Bioelectrogenesis group led by Dr. Abraham Nuñez Esteve in Alcalá University. Throughout this training trajectory, Dr. Bacchetti De Gregoris has developed a strong interest and bacterial taxonomy and evolution, microbial ecology, interkingdom-interactions and network dynamics in complex systems.

Dr. Amor Larrosa Guerrero
Researcher

Chemical Engineer (2004, University of Murcia). Ph.D. Chemical Engineering (2010, University of Newcastle, United Kingdom). She did research internships in Paul Sherrer Institute (2003, PSI, Switzerland) and the Biochemistry Institute of the University of Leipzig (Germany). She worked as junior researcher for the R&D department of NewChem Technologies Ltd. (2005, United Kingdom). She carried out her doctorate on microbial fuel cells (MFCs) for wastewater treatment. Part of her research received a YWP (IWA) award in the 11th Anaerobic Digestion World Congress (2007). She further investigated bioelectrochemical technologies during her stays at INTEMA (CONICET, Mar del Plata, Argentina) and the Technical University of Cartagena (UPCT). In the latter, she combined research work with lecturing in graduate and postgraduate programs and participation in scientific-technological dissemination and sustainable engineering projects. She has been involved in 6 projects funded by public and private institutions, she has co-directed 4 master projects and she has published 7 articles, 4 of them included in the Scientific Citation Index. Currently, she works as a researcher in iMdea Agua, developing microbial desalination cells (MDCs).

Rubén Rasines Ladero
Predoctoral Researcher

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

Mª Ángeles Lezcano Vega
Predoctoral Researcher

Degree in Environmental Sciences from 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.

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.

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

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.

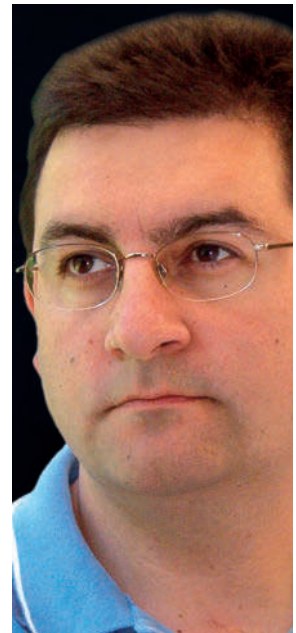
Research themes are flood hazard and risk analysis using geological and geomorphological methodologies, paleohydrology, dendrogeomorphology.

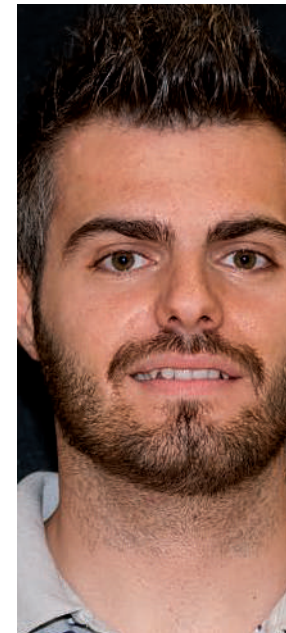
He has 208 publications, 29 papers on SCI Journals, more than 90 chapters on scientific books and more than 95 contributions to congresses and meetings.

Alberto de Tomás Calero

Predoctoral Researcher

Degree in Environmental Sciences from Alcalá University. Madrid. Spain.
MSc in Geographical Information Technologies from Alcalá University. Madrid. Spain.
Research: Estimating evapotranspiration through scintillometry and remote sensing.





economic and institutional analysis

Miguel Solanes

Researcher

Head of the Department of Economic and Institutional Analysis of IMDEA Water. He has been a water and legal advisor for the United Nations since 1984. Based in New York until 1994 before being seconded to ECLAC (Economic Commission for Latin America and the Caribbean) in Santiago, Chile. He has a rich experience in water law, privatisation and regulation of water-related utilities, international and interstate (federal countries) water law and public utilities and the international agreements for protection of foreign investment. As part of his research at the UN, Miguel (M.A. in Water Resource Management at Colorado State University and Research Scholar at the Kennedy School of Government) has promoted the need for stable and secure water rights as an incentive to private investment and water markets as efficiency devices and re-allocation tools in scarcity conditions or climate change scenarios. At the same time, he has provided evidence on the risk that non-conditioned water rights may encourage monopolisation. Miguel has provided legal advice for public policy design in Guatemala, Ecuador, Paraguay, Argentina, Peru, Syria, Jordan, Trinidad and Tobago, Turks and Caicos, Bahamas, St. Vincent and the Grenadines, Gambia, Tanzania, India, China, Sudan, Turkey, Brazil, Venezuela, Yemen, Ethiopia, Mozambique, Ghana, Oman, Solomon Islands, Papua New Guinea, Tuvalu, Kiribati, Bulgaria, Costa Rica, Chile, El Salvador, Colombia, Honduras Nicaragua, Vietnam, Thailand, Dominican Republic, South Africa and Morocco. In 2006 he was a member of the High Level Panel of Experts advising the UNDP on his Human Development Report on water and human development. In addition, he is currently a member of the Academic Panel of GTZ Global Water Dialogues and was co-ordinator of the South American Technical Advisory Committee (SAMTAC) of the Global Water Partnership (GWP) from 2001 to 2006 and member of the Technical Committee of that institution, from 1996 to 2006.

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

Lecturer on Economic Analysis at the UAH (1997-2012). He is one of the main researchers of the Department of Economic and Institutional Analysis of the IMDEA Water Foundation. Gonzalo has been the Co-ordinator of the research group on Environmental Economics at the Department of Economic Analysis of the UAH since 2001. International consultant for the Economic Commission for Latin America and the Caribbean (ECLAC), FAO, UNDP, UNESCO of the Organization of the United Nations (UNO), the Inter-American Development Bank (IADB) or the World Bank. Gonzalo has co-ordinated a number of research projects over the last few years: the economic valuation of ecosystem services in Spain (Ministry of the Environment, 2005-2009), with emphasis on the valuation of water ecosystem services; the economic analysis of environmental external (marginal) costs of electricity generation (IDAE, 2004-2005) or the economic valuation of water resources (GWP and the UN, 2001-2003), with case-studies on the rivers Mendoza (Argentina), Maule (Chile), Paraíba do Sul (Brazil), Catamayo-Chira (Peru), and Quindío (Colombia). Gonzalo was also a Research Manager for ECOTEC Research & Consulting (1999-2001), and developed a number of projects for the European Commission (economic analysis of environmental taxes and charges, water pricing, spatial development within the context of INTERREG Community Initiative and ESPON, etc.). In Latin America, he has developed the economic analysis of public policies for the promotion of liquid biofuels for transport (UN, 2006-2007). As one of the main researchers and coordinators of the Department of Economic and Institutional Analysis at IMDEA Water, Gonzalo has developed projects on water conflict management in Peru (World Bank), modernization of water resources management in Chile (World Bank), the evaluation of the International Hydrological Programme (IHP-VI) for UNESCO, or the economic analysis of groundwater governance (GEF-WB-UNESCO/IHP-FAO-IAH project), as well as the FP7 research project on the use of economic instruments for sustainable water management (EPI-Water, 2011-2013). From September 2012 on, Gonzalo is a policy advisor on EU Freshwater Policy through a Framework Contract (2012-2016) for the EC DG Environment.

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

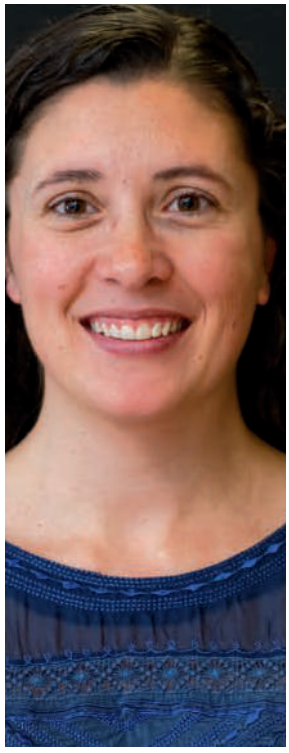
Degree in Environmental Sciences from Autonomous University of Madrid. Spain.
MSc in Hidrology and Water Resources Management at Alcalá University and Rey Juan Carlos University, Madrid. Spain
Research: Drivers affecting the industrial structure of water and sanitation services.

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 years as postdoctoral researcher, combining both research and lecturing activities. She has also worked at Tianjin University (China) for a year under Chinese public funding.

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

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

Dr. Manuel Fuentes Conde

Associated Researcher

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

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

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

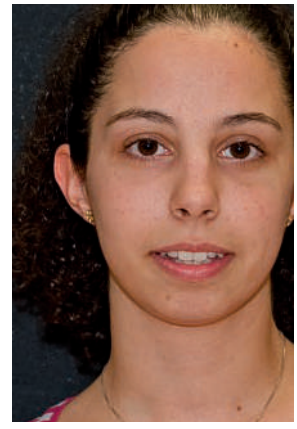
laboratory technicians

Francisco Martínez Serrano
Laboratory Technician

IVT: Environmental Chemistry.

Carolina Guillén Fuentes
Laboratory Technician

IVT: Control and Analysis.
IVT: Environmental Chemistry.



Amaya Romero Salas
Laboratory Technician

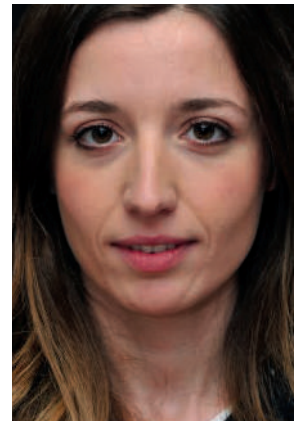
IVT: Control and Analysis.

Covadonga Alonso Alonso
Laboratory Technician

Degree in Chemistry by the Autonomous University of Madrid, Spain

Dr. María Isabel López Heras
Laboratory Technician

PhD in Analytical Chemistry by Complutense University of Madrid, Spain



Beatriz Peinado Rodríguez
Laboratory Technician

IVT: Environmental Health
IVT: Clinical Diagnostic Laboratory

management area and administration

Rafael Irastorza Vaca
Manager

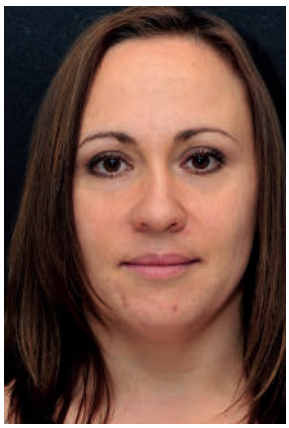
Degree in Economic Sciences.

Juana Sanz García
R&D Management

PhD in Environmental Sciences.

María Luz Barquilla Crespo
Accountant Technician

Degree in Economic Sciences.

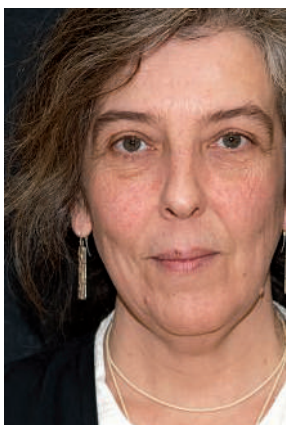


José Ángel Gómez Martín
Technology transfer technician

Degree in Environmental Sciences.

Celia Barral Nieto
Technician in Administration and Finance

Josefa Simón Recio
Secretary



infrastructures and scientific equipment

annual report 2014

4.1. Water Laboratory

The water analysis lab has up-to-date analytical equipment to enable detection of organic micropollutants. Moreover, it is fitted with all the basic scientific equipment needed to carry out research into contaminant detection and monitoring of pollution processes necessary to work on different types of water (consumption, waste, surface, etc.) in an integrated manner. Furthermore, the laboratory has equipment for research in membrane technology.

Organic and inorganic microocontaminants

The main equipment is for chromatography, both gas and liquid, coupled with mass spectrometry:

- Bidimensional gas chromatography coupled with a mass spectrometer with flight time detector (GCxGC/TOF) with an automatic multi-injection system
- Gas chromatograph coupled with a simple quadrupole mass spectrometer (GC-QqQ-MS/MS)
- Liquid chromatography coupled with mass spectrometer (LC-Q-TOF-MS/MS) for determining mass errors of less than 3 ppm
- High performance liquid chromatography (HPLC-UV)
- Necessary equipment for the extraction of samples using SPE, LLE, PLE
- ICP-Mass

Basic Analysis

The main equipment:

- Ionic Chromatography computer for analysis of anions and cations
- Total Organic Carbon analyser
- Thermoreactor and photometer for determining COD
- Respirometric Oxitop method for determinig BOD
- Automatic titrator for alkalinity
- Volumetric sensor for measuring particles in water
- Spectrophotometers
- Multimeter (measuring pH, conductivity, and potential Redox)
- Turbiditymeter and colorimeter

4.2. Biology and Microbiology Laboratory

The laboratory is divided in three areas: Molecular Microbiology, Microbial Bioelectrochemistry and Hydrobiology.
In addition to all basic equipment necessary to perform the research tasks, the lab is equipped with:

- Binoculars with transparent and reflected light sources, Olympus SZ51
- Microscope, Olympus CX41
- Colony counter
- Gel Documentation System, AlphaImager
- Real Time PCR machine, AB7300
- Nano-photometer, Epoch
- Gel Electrophoresis Equipment
- PCR Thermocycler

4.3. Laboratory of Membranes and Small Pilot Plants

The Laboratory of Membranes and Small Pilot Plants has equipment for research in membrane technology, including:

- A laboratory-scale cross-flow stainless steel test unit for flat-sheet membranes (different active membrane surface)
- Wound-spiral ultrafiltration and reverse osmosis membrane (pilot plant)

4.4. Geomatics Laboratory

http://geomaticaagua.blogspot.com.es/

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:

- Twelve terminals under a central server.
- Peripherals of different sizes, including printers, plotters and a medium format scanner.

- Support materials which aid data collection and its inclusion in drive systems (laptops, pagers, GPS and SLR cameras).
- ARCGIS
- GIS IDRISI
- GIS ILWIS
- GIS GVSIG
- ERDAS IMAGINE
- Geostatistics SURFER
- Spatial Metric Analysis -FRAGSTAT
- Estimation of Soil Parameters, Hydrologic Modelling - HEC and SWMM family
- Water Erosion Models – WEAP

4.5. Soil Laboratory

IMDEA Water is provided with a soil laboratory primed and ready to process and analyse soil samples. Physical, physico-chemical, and chemical soil properties are determined for the complete analysis of the soils, with special attention to processes related with soil contamination and remediation. It is equipped to carry out soil determinations such as particle size distribution, organic carbon content, water content, soil colour, pH, electrical conductivity, total calcium carbonate, cation exchange capacity, exchangeable bases and total metal contents, among others. For all analyses, the laboratory is fitted with the following equipment:

- COY Type C Vinyl Anaerobic Chamber
- Centrifuge (EPPENDORF 5810R)
- Overhead Shaker (HEIDOLPH Reax 20)
- Mixer Mill (RETSCH MM400)
- Electromagnetic Sieve Shaker (CISA RP20)
- Vibratory Micro-Mill (FRITSCH Pulverisette 0)
- Orbital Mixer and Shaker with heating platform (SELECTA)
- Drying and Sterilising Natural Convection Oven with Temperature and Time Regulation and Digital Reading (SELECTA)
- Electronic Autoclave for Sterilisation (SELECTA)
- UV-Spectrophotometer (SHIMADZU UV-1800)
- Hotplate (SELECTA)
- Electronic Balance (GIBERTINI)
- Electronic Analytical and Precision Balance (SARTORIUS)
- Microprocessor Conductivity Meter (EC/TDS/NaCl/ºC) (Hanna Instruments HI 2300)
- pH-Meter (CRISON GLP 21+)
- Sand Bath (SELECTA Combiplac-Sand)

- Magnetic Stirrer (NAHITA)
- Agate Mortar
- Calcimeter
- Surface Layer Scintillometer for measuring sensible heat and momentum fluxes
- Bowen Ratio Psychrometers

4.6. Water and Energy Laboratory

Manufacturing

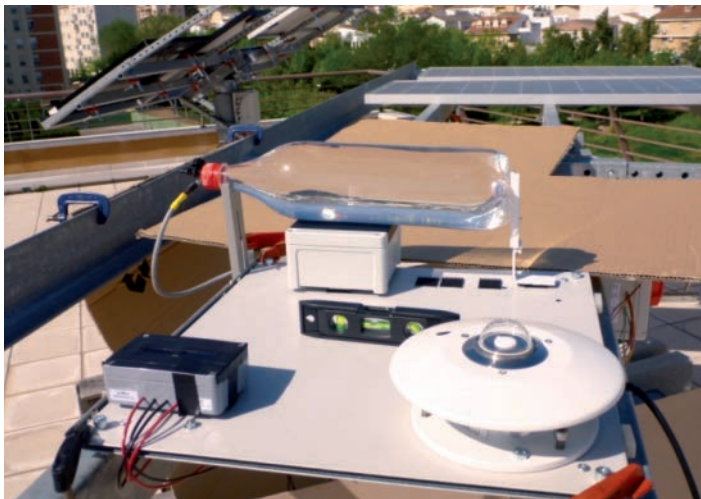
- Soldering station, vacuum pumps and chambers for cell encapsulation with silicone

Electronic testing

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

Outdoors monitoring

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



research results and knowledge dissemination

annual report 2014

5.1. Scientific Papers

5.1.1. Articles in journals

1. Agha, R., Lezcano, M.A., Labrador, M.M., Cirés, S., Quesada, A. (2014) Seasonal dynamics and sedimentation patterns of Microcystis oligopeptide-based chemotypes reveal subpopulations with different ecological traits. Limnol. Oceanogr., 59 (3). pp. 861-871.

2. Arribas, P., Khayet, M., García-Payo, M.C. (2014) Self-sustained electro-spun polysulfone nano-fibrous membranes and their surface modification by interfacial polymerization for micro- and ultra-filtration. Separation and Purification Technology 138, pp. 118-129.

3. Carbajo, J.B., Perdigón.Melón, J.A:, Petre, A., Rosal, R., García-Calvo, E. (2014). Personal care preservatives: risk assessment and prediction of their mixture toxicities with an insdustrial wastewater. Water Res. Publicación on-line 30/12/2014.

4. Carreño, F., García-Martínez, S., Lillo, J., Fernández-Martínez, R. (2014) Building a 3D geomodel for water resources Management: case study in the Regional Park of the lower courses of Manzanares and Jarama Rivers (Madrid, Spain). Environmental Earth Sciences, 71 (1). pp. 61-66.

5. Chary, N.S., Herrera, S., Gómez, M.J., Fernández-Alba, A.R. (2014) Determination of hormonally active chlorinated chemicals in waters at sub µg/L level using stir bar sorptive extraction-liquid desorption followed by negative chemical ionization-gas chromatography triple quadrupole mass spectrometry. International Journal of Environmental Analytical Chemistry, 94 (1). pp. 48-64.

6. Corvea, J.L., Blanco, A., De Bustamante, I., Farfán, H., Martínez-Maqueira, Y., Novo, R., Díaz-Guanche, C., López, N. (2014) Advances in Geoconservation in Cuba: Assessment of the Guaniguanico Range and Guanahacabibes Plain (Pinar del Río). Geoheritage, 6 (1). pp. 1-16.

7. De Miguel, Á., Meffe, R., Leal, M., González-Naranjo, V., Martínez-Hernández, V., Lillo, J., Salas, J.J., Martín, I., De Bustamante, I. (2014) Treating municipal wastewater through a vegetation filter with a short-rotation poplar species. Ecological Engineering, 73. pp. 560-568.

8. De Tomás, A., Nieto, H., Guzinski, R., Salas, J., Sandholt, I., Berliner, P. (2014) Validation and scale dependencies of the triangle method for the evaporative fraction estimation over heterogeneous areas. Remote Sensing of Environment, 152. pp. 493-511.

9. Essalhi, M., Khayet, M. (2014) Application of a porous composite hydrophobic/hydrophilic membrane in desalination by air gap and liquid gap membrane distillation: A comparative study. Separation and Purification Technology, 133. pp. 176-186.

10. Essalhi, M., Khayet, M. (2014) Self-sustained webs of polyvinylidene fluoride electrospun nano-fibers: Effects of polymer concentration and desalination by direct contact membrane distillation. Journal of Membrane Science, 454. pp. 133-143.

11. Farfán, H., Corvea, J.L., De Bustamante, I. (2014) First outcomes in the definition of groundwater protection zones at the Viñales National Park (Cuba) and surrounding area. Environmental Earth Sciences, 71 (1). pp. 3-11.

12. Fernández de Córdova, J., Pascual, J.A. (2014) Approaching water management at watershed scale using distributed water balances in the Yanuncay River basins (Ecuador). Environmental Earth Sciences, 71 (1). pp. 53-60.

13. Fuentes, M., Vivar, M., Burgos, J.M., Aguilera, J., Vacas, J.A. (2014) Design of an accurate, low-cost autonomous data logger for PV system monitoring using Arduino™ that complies with IEC standards. Solar Energy Materials and Solar Cells, 130. pp. 529-543.

14. García-Fernández, L., García-Payo, M.C., Khayet, M. (2014) Effects of mixed solvents on the structural morphology and membrane distillation performance of PVDF-HFP hollow fiber membranes. Journal of Membrane Science, 468. pp. 324-338.

15. Gonzalo, S., Rodea-Palomares, I., Leganés, F., García-Calvo, E., Rosal, R., Fernández-Piñas, F. (2014) First evidences of PAMAM dendrimer internalization in microorganisms of environmental relevance: A linkage with toxicity and oxidative stress. Nanotoxicology. (online 17.10.2014)

16. González-Naranjo, V., Boltes, K., De Bustamante, I., Palacios, M.P. (2014) Environmental risk of combined emerging pollutants in terrestrial environments: chlorophyll a fluorescence analysis. Environmental Science and Pollution Research. (online 05.12.2014)

17. Gómez, C.M., Pérez-Blanco, C.D. (2014) Simple Myths and Basic Maths About Greening Irrigation. Water Resources Management, 28 (12). pp. 4035-4044.

18. Gómez, C.M., Pérez-Blanco, C.D., Batalla, R. (2014) Tradeoffs in River Restoration: Flushing Flows vs. Hydropower Generation in the Lower Ebro River, Spain. Journal of Hydrology, 518. pp. 130-139.

19. Herrera-Lopez, S., Hernando, M. D., García-Calvo, E., Fernández-Alba, A. R., Ulaszewska, M. M. (2014) Simultaneous screening of targeted and non-targeted contaminants using an LC-QTOF-MS system and automated MS/MS library searching. Journal of Mass Spectrometry, 49 (9). pp. 878-893.

20. Iepure, S., Meffe, R., Carreño, F., Rasines-Ladero, R., De Bustamante, I. (2014) Geochemical, geological and hydrological influence on ostracod assemblages distribution in the hyporheic zone of two Mediterranean rivers in central Spain. International Review of Hydrobiology (99). pp. 435-449.

21. Kiai, H., García-Payo, M.C., Hafidi, A., Khayet, M. (2014) Application of membrane distillation technology in the treatment of table olive wastewaters for phenolic compounds concentration and high quality water production. Chemical Engineering and Processing: Process Intensification, 86. pp. 153-161.

22. Lado, J.J., Pérez-Roa, R., Wouters, J.J., Tejedor-Tejedor, M.I., Anderson, M.A. (2014) Evaluation of Operational Parameters for a Capacitive Deionization Reactor Employing Asymmetric Electrodes. Separation and Purification Technology, 133. pp. 236-245.

23. Leal, M., Lillo, J., Márquez, Á. (2014) Assessment of groundwater circulation in La Gomera aquifers (Canary Islands, Spain) from their hydrochemical features. Environmental Earth Sciences, 71 (1). pp. 23-30.

24. Martínez-Graña, A.M and Goy, J.L., De Bustamante, I., Zazo, C. (2014) Characterization of environmental impact on resources, using strategic assessment of environmental impact and management of natural spaces of "Las Batuecas-Sierra de Francia" and "Quilamas" (Salamanca, Spain). Environmental Earth Sciences, 71 (1). pp. 39-51.

25. Martínez-Hernández, V., Meffe, R., Herrera, S., Arranz, E., De Bustamante, I. (2014) Sorption/desorption of non-hydrophobic and ionisable pharmaceutical and personal care products from reclaimed water onto/from a natural sediment. Science of The Total Environment, 472. pp. 273-281.

26. Meffe, R., De Bustamante, I. (2014) Emerging organic contaminants in surface water and groundwater: A first overview of the situation in Italy. Science of The Total Environment, 481. pp. 280-295.

27. Meffe, R., Kohfahl, C., Hamann, E., Greskowiak, J., Massmann, G., Dünnbier, U., Pekdeger, A. (2014) Fate of para-toluenesulfonamide (p-TSA) in groundwater under anoxic conditions: modelling results from a field site in Berlin (Germany). Environmental Science and Pollution Research, 21. pp. 568-583.

28. Molina, S., Carretero, P., Teli, S.B., De la Campa, J.G., Lozano, Ángel E., De Abajo, J. (2014) Hydrophilic porous asymmetric ultrafiltration membranes of aramid-g-PEO copolymers. Journal of Membrane Science, 454. pp. 233-242.

29. Pascual, J.A., Andreu, V., Vázquez, P., Picó, Y. (2014) Presence and spatial distribution of emerging contaminants (drugs of abuse) in protected agroecological systems (L'Albufera de Valencia Coastal Wetland, Spain). Environmental Earth Sciences, 71 (1). pp. 31-37.

30. Pérez-Blanco, C.D., Gómez, C.M. (2014) Insuring water: a practical risk management option in water-scarce and drought-prone regions? Water Policy, 16 (2). p. 244-263.

31. Rodrigo, J., Boltes, K., Esteve-Nuñez, A. (2014) Microbial-electrochemical bioremediation and detoxification of dibenzothiophene-polluted soil. Chemosphere, 101. pp. 61-65.

32. Santiago-Morales, J., Rosal, R., Hernando, M.D., Ulaszewska, M.M., García-Calvo, E., Fernández-Alba, A.R. (2014) Fate and transformation products of amine-terminated PAMAM dendrimers under ozonation and irradiation. Journal of Hazardous Materials, 266. pp. 102-113.

33. Sanz, J.M., De Miguel, Á., De Bustamante, I., De Tomás, A., Goy, J.L. (2014) Technical, financial and location criteria for the design of Land Application System Treatment. Special Issue. Environmental Earth Sciences, 71 (1). pp. 13-21.

34. Gonzalo, S., Llaneza, V., Pulido-Reyes, G., Fernández-Piñas, F., Leganes, F., Rosal, R., García-Calvo, E., Rodea-Palomares, I. (2014) A Colloidal Singularity Reveals the Crucial Role of Colloidal Stability for Nanomaterials In-Vitro Toxicity Testing: nZVI-Microalgae Colloidal System as a Case Study. PLoS ONE, 9 (10). e109645.

35. Vivar, M., Fuentes, M., Norton, M., Makrides, G., De Bustamante, I. (2014) Estimation of sunshine duration from the global irradiance measured by a photovoltaic silicon solar cell. Renewable and Sustainable Energy Reviews, 36. pp. 26-33.

36. Wang, Z., Wang, Y., Vivar, M., Fuentes, M., Zhu, L., Qin, L. (2014) Photovoltaic and photocatalytic performance study of SOLWAT system for the degradation of Methylene Blue, Acid Red 26 and 4-Chlorophenol. Applied Energy, 120. pp. 1-10.

5.1.2. Other articles

1. Fuentes, M., Vivar, M., Aguilera, J., Vacas, J.A. (2014) Diseño de un data logger de bajo coste usando Arduino. Aplicación para la monitorización de sistemas fotovoltaicos cumpliendo el estándar IEC. Parte 1ª. SolarNews (55). pp. 20-27.

2. Pérez-Blanco, C.D., Gómez, C.M. (2014) Drought management plans and water availability in agriculture: A risk assessment model for a Southern European basin. Weather and Climate Extremes, 4. pp. 11-18.

5.1.3. Books

1. Alvarenga, F.M., Amariei, G., Gómez-Llano, R., Guerrero, M.P., Ortego, R., Torres, S.S. (2014) Proyectos 2014 - Máster Universitario en Hidrología y Gestión de los Recursos Hídricos. Instituto IMDEA Agua. ISBN 978-84-697-1453-9

2. Fernández-Santamarín, A., Gago, C., Miralles, P., Migens, A., Mostaza, D., Vivar, M. (2014) Proyectos 2013 - Máster Universitario en Hidrología y Gestión de los Recursos Hídricos. Instituto IMDEA Agua. ISBN 978-84-616-8388-8

3. Moreno, E., García-Calvo, E. (2014) Conociendo el "Gas Natural". Actualidad y perspectivas. Instituto IMDEA Agua. ISBN 978-84-616-8423-6

4. Pérez-Blanco, C.D., Gómez, C.M. (2014) An Integrated Risk Assessment Model for the Implementation of Drought Insurance Markets in Spain. FEEM Working Paper 62.2014. Venice, FEEM (Fondazione Eni Enrico Mattei).

5. Pérez-Blanco, C.D., Gómez, C.M., Batalla, R.J., (2014). The Flushing Flow Cost: A Prohibitive River Restoration Alternative? The Case of the Lower Ebro River. FEEM Working Paper 068.2014. Venice, FEEM (Fondazione Eni Enrico Mattei).

5.1.4. Books Chapters

1. De Bustamante, I., Cabrera, M.C., Candela, L., García-Calvo, E. (2014) Reuso: Experiencias en España. In: Alternativas hídricas para la Macrozona Norte (Chile). Universidad Arturo Prat, pp. 67-77. ISBN 978-956-302-084-7

2. Essalhi, M., Khayet, M. (2014) Membrane Distillation. In: Progress in Filtration and Separation. Elsevier (Imprint Academic Press Inc.) ISBN 978-0123847461

3. Gutiérrez, C., Pérez-Blanco, C.D., Gómez, C.M., Berbel, J. (2014) Price Volatility and Water Demand in Agriculture. A Case Study of the Guadalquivir River Basin (Spain). In: Economics of Water Management in Agriculture. Taylor and Francis Group CRC Press, pp. 319-348. ISBN 978-1-4822-3839-6

4. Jacobi, P.R., De Stefano, L., López-Gunn, E., Solanes, M., Delacámara, G., Marín, G., Embid, A., Empinotti, V., Donoso, G., Rica, M., Uribe, N., Jiménez, A., Blanco, E. (2014) Reforming Water Institutions. In: Water and Food Security in Latin America. Routledge (Earthscan), pp. 285-315. ISBN 978-0-415-71368-9

5. Lillo, J., Oyarzun, R., Esbrí, J.M., García-Lorenzo, M.L., Higueras, P. (2014) Pb–Zn–Cd–As Pollution in Soils Affected by Mining Activities in Central and Southern Spain: A Scattered Legacy Posing Potential Environmental and Health Concerns. In: The Handbook of Environmental Chemistry. Springer Berlin Heidelberg, pp. 1-31.

6. Vivar, M. (2014) Clean Water PV Sensors. In: Proyectos 2013 - Máster Universitario en Hidrología y Gestión de los Recursos Hídricos. Instituto IMDEA Agua. ISBN 978-84-616-8388-8

5.1.5. Scientific-Technical Reports

1. De Bustamante, I., Cifres, E., Argüello, F., Cánovas, J., Guerrero, L. *New technologies: Non conventional water resources and information* II Foro Mediterráneo del Agua, Murcia. 25 - 27 november.

2. Gómez, C.M., Delacámara, G., García, J., 2014. Infrastructure and economic incentives to reduce vulnerability to drought in Segura and Tagus basins. Climate-ADAPT European Adaptation Platform, case study illustration. http://climate-adapt.eea.europa.eu/viewmeasure?ace_measure_id=350

5.2. Lectures

1. De Bustamante, I. *Depuración y calidad de aguas en la Demarcación del Tajo.* VII Jornadas por un Tajo Vivo. Red del Tajo. Garrovillas de Alconétar, Cáceres. 6 - 8 july.

2. De Bustamante, I. *Gestión integrada del agua asociada al cambio climático.* II Simposio sobre Gestión del Agua en Espacios Protegidos. Parque Natural Alejandro de Humboldt, Cuba. 24 october.

3. De Miguel, A., García-Pacheco, R. *¿Usas o reutilizas?* Escuela Politécnica Superior de Ávila. Ávila. 17 november.

4. Delacámara, G. *A contrasting view: NWRM in the Mediterranean region*. First Western Workshop. EU NWRM Pilot Project. Bruselas, Bélgica. 23 january.

5. Delacámara, G. *Good enough? Evidence on multiple benefits of NWRM from EU's NWRM Pilot Project*. 6th European River Restoration Conference (ECRR). Viena, Austria. 27 - 29 october.

6. Delacámara, G. *Let's be fair, let's be accurate – Evidence on costs and benefits of NWRM*. Second Mediterranean Workshop. EU NWRM Pilot Project. Turín, Italia. 11 de september.

7. Delacámara, G. *Natural Water Retention Measures (NWRM): who should pay and why?* Second Baltic Workshop. EU NWRM Pilot Project. Gimo, Suecia. 10 june.

8. Esteve-Núñez, A. *How are MET in bed? From fixed to mobile.* 2nd European Meeting of the International Society for Microbial Electrochemistry and Technology (EU-ISMET 2014). Alcalá de Henares, Madrid. 3 - 5 september.

9. Esteve-Núñez, A. *Microbial production of electricity in wastewater treatment plants.* 2nd IWA Specialized International Conference "Ecotechnologies for Wastewater Treatment (EcoSTP2014)". Verona, Italia. 23 - 25 june.

lectures

10. García-Calvo, E., Vivar, M. *El agua regenerada: una fuente segura.* Ciclo de Conferencias: El agua, ¿fuente de vida? FECYT. Residencia de Estudiantes. Madrid. 3 march.

11. García-Pacheco, R., De Miguel, A. *¿Qué agua elegirías para beber? Comprende cómo potabilizar tu agua.* Escuela Politécnica Superior de Ávila. Ávila. 10 november.

12. Gómez, C.M. *The multiple dimension of NWRM: policy and economic issues related to the multiple dimensions of NWRM.* Second Western Workshop. EU NWRM Pilot Project. Estrasburgo, Francia. 1 july.

13. Gómez, C.M. y Delacámara, G. *Mainstreaming water trading in water policy.* International Conference on Policy Mixes in Environmental and Conservation Policies. Sesión: Water policies, watershed management and ecosystem services. Leipzig, Alemania. 26 february.

14. Gómez, C.M. y Delacámara, G. *Water scarcity in southern Europe: taking advantage of synergies and interactions between economic policy instruments to build water security.* International Conference on Policy Mixes in Environmental and Conservation Policies. Sesión: Water policies, watershed management and ecosystem services. Leipzig, Alemania. 26 february.

15. Khayet, M. *Advances in membrane distillation for water desalination: Past and present for the future.* King Fahd University of Petroleum and Minerals (KFUPM). Dhahran, Arabia Saudí. 27 february.

16. Khayet, M. *Nanotechnology in wastewater treatment.* The 2nd Saudi International Water Technology Conference 2014. Riyadh, Arabia Saudí. 23 - 25 february.

17. Khayet, M. *Recent progress of electrospun nanofibrous membranes for desalination.* Saudí Chemical Engineering Society (SChES). King Saud University. Riyadh, Arabia Saudí. 25 february.

5.3. Round Tables

1. De Bustamante, I. *Agua y espacio urbano.* Hidrópolis: Agua y espacio urbano. Nuevas relaciones entre agua y arquitectura en la ciudad contemporánea. Madrid. 28 january.

2. De Bustamante, I. *Del interés investigador a la oportunidad. alianzas y estímulos. Incentivación, liderazgo y financiación.* Puentes entre Ciencia y Práctica en la I+D+i del agua. AEAS (Asociación Española de Abastecimiento de Agua y Saneamiento). Madrid. 4 june.

3. De Bustamante, I. *Los EPTIs en las Demarcaciones de Guadiana y Tajo.* Jornadas sobre Las aguas subterráneas en los Esquemas Provisionales de Temas Importantes (EPTI). Madrid. 7 - 8 may.

4. De Bustamante, I. *Tratamiento del agua.* IV Foro iAgua Magazine (Gestión del Tratamiento del Agua en España). Roca Madrid Gallery. Madrid. 17 july.

5. Delacámara, G. (moderador). Mesa: *Tendencias en economía verde y colaborativa*, en la 53 Jornada Corresponsables. Madrid. 4 june.

6. Esteve-Núñez, A. Mesa de debate en jornada-taller: *Puentes entre Ciencia y Práctica en la I+D+i del gua.* AEAS (Asociación Española de Abastecimiento de Agua y Saneamiento). Madrid. 4 june.

7. García-Calvo, E. *El agua, una molécula fundamental.* IV Edición del Curso de Divulgación "Los Avances de la Química y su Impacto en la Sociedad". Curso interuniversitario. Madrid. 30 january.

8. García-Calvo, E. *El binomio agua-energía desde diferentes puntos de vista.* II Foro iAgua Magazine (Binomio Agua y Energía). La Roca Madrid Gallery. Madrid. 12 february.

round tables

working groups

5.4. Working Groups

1. Cánovas, J., De Bustamante, I., Cifres, E., Argüello, F., El Afti, T., Ben Abdelfadel, A., Abdel Wahaab, R. *New technologies: Non conventional water resources and information and comunication technologies*. Atelier Regional de Lancement du Duxieme Forum Mediterranéen de l'Eau. Rabat, Marruecos. 18 june.

2. Delacámara, G. *Affordability and disproportionate costs*. Water Framework Directive Common Implementation Strategy (CIS) Working Group Economics meeting. Bruselas, Bélgica. 20 october.

3. Delacámara, G. *Assessing costs and benefits of NWRM*. Water Framework Directive Common Implementation Strategy (CIS) Working Group Programmes of Measures (PoM) meeting. Bruselas, Bélgica. 14 october.

4. Delacámara, G. *The role of innovative economic incentives – Guidance on the design and development of Economic Policy Instruments in European water policy*. Water Framework Directive Common Implementation Strategy (CIS) Working Group Economics meeting. Bruselas, Bélgica. 21 march.

participation in scientific committees

5.5. Participation in Scientific Committees

1. De Bustamante, I. II Congreso Ibérico de Aguas Subterráneas (CIAS 2014). Valencia. 8 - 10 september.

2. De Bustamante, I. II Simposio sobre Gestión del Agua en Espacios Protegidos. Parque Natural Alejandro de Humboldt, Cuba. 20 - 25 october.

3. Delacámara, G. Natural Water Retention Measures (NWRM) 1st Mediterranean Regional Workshop. Alcalá de Henares, Madrid. 28-29 january.

4. Delacámara, G. Natural Water Retention Measures (NWRM) 2nd Mediterranean Regional Workshop. Turín, Italia. 11-12 september.

5. Gómez, C.M. Natural Water Retention Measures (NWRM) 1st Mediterranean Workshop. Alcalá de Henares, Madrid. 28-29 january.

6. Gómez, C.M. Natural Water Retention Measures (NWRM) 2nd Mediterranean Regional Workshop. Turín, Italia. 11-12 september.

7. Khayet, M. Conective Heat and Mass Transfer (CONV-14). Kusadasi, Turquía. 8 - 13 june.

8. Khayet, M. IX Ibero-American Congress on Membrane Science and Technology (CITEM 2014). Santander. 25 - 28 may.

9. Khayet, M. The 2014 International Conference on Advances in Membrane Water Traetment. Busan, Corea del Sur. 24 - 28 august.

5.6. Oral Communications

1. Bacchetti, T., Aguirre, A., Reija, A., Berna, A., Salas, J.J., Esteve-Núñez, A. *Comparison of microbial communities at full-scale hybrid Microbial Electrochemical Constructed Wetlands (METlands) for urban wastewater treatment.* 2nd European Meeting of the International Society for Microbial Electrochemistry and Technology (EU-ISMET 2014). Alcalá de Henares, Madrid. 3 - 5 september.

2. Blanco, A. *Georreferenciación de mapas antiguos de la Comunidad de Madrid.* V Jornada de Jóvenes Investigadores de la Universidad de Alcalá. Alcalá de Henares, Madrid. 3 december.

3. Essalhi, M. Khayet, M. *Effects of polymer concentration on the characteristics and membrane distillation performance of nano-fibrous membranes.* IX Ibero-American Congress on Membrane Science and Technology (CITEM 2014). Santander. 25 - 28 may.

4. Fernández-Piñas, F., Rodea-Palomares, I., Gonzalo, S., Rosal, R., Leganés, F. *First evidences of PAMAM dendrimer internalization in microalgae and cyanobacteria: linkages with toxicity and oxidative stress.* SETAC Europe 24th Annual Meeting. Basilea, Suiza. 11 - 15 may.

5. Fuentes, M., Vivar, M. *A Real Low-Cost, Simple Datalogger for Renewable Energy Applications: Case of Photovoltaic Systems.* International Conference on Renewable Energy and Climate Change (ICRECC) 2014. Universidad del Pacífico Sur. Suva, Fiji. 14 - 18 july.

6. Gonzalo, S., Llaneza, V., Pulido-Reyes, G., Fernández-Piñas, F., Bonzongo, J.C., Leganés, F., Rosal, R., Rodea-Palomares, I. *Colloidal stability dictates the toxicity of nZVI towards the green alga P. Subcapitata.* SETAC Europe 24th Annual Meeting. Basilea, Suiza. 11 - 15 may.

7. Khayet, M. Essalhi, M. *Mixed-matrix electrospun nano-fibrous membranes for desalination.* IX Ibero-American Congress on Membrane Science and Technology (CITEM 2014). Santander. 25-28 may.

8. Khayet, M. Essalhi, M. *Use of carbon nanotubes in desalination by membrane distillation through electrospinning.* International Conference on Diamond and Carbon Materials. Madrid. 7 - 11 september.

9. Khayet, M. *Solar energy system design using advanced learning aids (SOLEDA): An EU Tempus project.* 8Th International Technology, Education and Development Conference (INTED 2014). Valencia. 10 - 12 march.

10. Khayet, M. *Synthesis and application of surface modifying macromolecules for fabrication of advanced composite membranes.* 4th International Colloids Conference: Surface Design and Engineering. Madrid. 15 - 18 june.

11. Larrea, J., Rojas, M., Bacchetti, T., Lugo, D., Heydrich, M., Esteve-Núñez, A., Boltes, K. *Influencia de contaminantes qímicos y microbiológicos sobre la estructura de las comunidades bacterianas del río Almendares.* 1er Taller de Integración para el Desarrollo. Centro Nacional de Electromagnetismo Aplicado (CNEA). Santiago de Cuba, Cuba. 25 - 27 june.

12. Pulido-Reyes, G., Rodea-Palomares, I., Leganés, F., Sudipta Seal, S.D., Rosal, R., Fernández-Piñas, F. *The effect of colloidal stability and valence states of cerium oxide nanoparticles on cellular toxicity.* Nanosafety Forum for Young Scientists Congress. Siracusa, Sicilia, Italia. 8-9 october.

13. Quirós, J., Aguado, S., Boltes, K., Guzman de Villoria, R., Vilatela, J.J., Rosal, R. *Outstanding antibacterial activity of cobalt imidazolate metal-organic frameworks incorporated into electrospun fibers.* VIII International Congress of ANQUE. Science and Technology of Materials. Madrid. 1 - 4 july.

14. Rasines-Laredo, R., Iepure, S., Llorente-García, R., Chocrón-Niego, I., Ramos-Cobos, I. *Influence of habitats heterogeneity of groundwater-feed streams on hyporheic crustaceans, in a Mediteranean river basin, Iberian Peninsula.* Limnología 2014, XVII Congress of the Iberian Association of Limnology. Universidad de Cantabria. Santander. 6 - 11 july.

15. Rodea-Palomares, I., Gonzalo, S., Rosal, R., Leganés, F., Fernández-Piñas, F. *PAMAM dendrimers internalizes quickly in microalgae and cyanobacteria causing toxicity and oxidative stress.* Congreso NanoBio&Med 2014. Barcelona. 18 - 21 november.

16. Vivar, M., Fuentes, M. *Hybrid Solar Photovoltaic-Photochemical Systems for Water Disinfection and Electricity Generation.* International Conference on Renewable Energy and Climate Change (ICRECC) 2014. Universidad del Pacífico Sur. Suva, Fiji. 14 - 18 july

5.7. Posters

1. Borjas, Z., Ortiz, J.M., Larrosa-Guerrero, A., Esteve-Nuñez, A. *Electroactive bacteria selection by a multi-stage culture gradostat system.* 2nd European Meeting of the International Society for Microbial Electrochemistry and Technology (EU-ISMET 2014). Alcalá de Henares, Madrid. 3 - 5 september.

2. Essalhi, M. Khayet, M. *Effects of electrospinning parameters on the nanostructure of polymeric nanofibrous membranes.* 4th International Colloids Conference: Surface Design and Engineering. Madrid. 15 - 18 june.

3. González-Naranjo, V., Boltes, K., De Bustamante, I., Lillo, J., Valle-Fernández, L., Martín, I., Salas, J.J., Bouza, R. *Reutilización de aguas para el riego: Uso de una planta de cultivo como indicador de calidad.* ANQUE-ICCE-BIOTEC 2014. Madrid. 1 - 4 july.

4. González-Naranjo, V., De Bustamante, I., Boltes, K., Lillo, J., García-Lucena, P., Martín, I., Salas, J.J., Bouza, R. *Evaluación de los efectos en el suelo del riego con agua regenerada mediante la medición del contenido de masa microbiana.* ANQUE-ICCE-BIOTEC 2014. Madrid. 1 - 4 july.

5. Goy, J.L., Corvea, J.L., Díaz-Guanche, C., De Bustamante, I., Martínez-Graña, A., Zazo, C. *Cartofrafía Geomorfológica del Parque Nacional Viñales (Pinar del Río, Cuba).* II Simposio sobre Gestión del Agua en Espacios Protegidos. Parque Natural Alejandro de Humboldt, Cuba. 24 october.

6. Goy, J.L., Martínez-Graña, A., Sanz, J.M., Cruz, R., De Bustamante, I., Zazo, C., González-Delgado, A. *Itinerario virtual 3D del patrimonio geomorfológico-hidrológico de los ENP del S.O. de Castilla-León (Ávila-Salamanca-Zamora), España.* II Simposio sobre Gestión del Agua en Espacios Protegidos. Parque Natural Alejandro de Humboldt, Cuba. 24 october.

7. Iepure, S., Gómez, D., Lillo, J., Rasines-Laredo, R., Persoiu, A. *Applying electrical resistivity tomography and biological methods to assess the surface-groundwater interaction in two Mediterranean rivers (central Spain).* European Geosciences Union (EGU) General Assembly 2014. Viena, Austria. 27 april - 2 may.

8. Iepure, S., Hutchinson, S., Tadeusz Namiotko, T., Feurdean, A. *5,000 years of water level changes infered from ostracod assemblages in a lowland lake in Romania (Central Eastern Europe).* European Geosciences Union (EGU) General Assembly 2014. Viena, Austria. 27 april - 2 may.

9. Iepure, S., Lillo, J. *State of the art of hyporheic invertebrates from glacial-feed streams in two contrasted scenario.* Workshop: Ecology of Glacier Forelands. Obergurgl, Austria. 17 - 21 de september.

10. Iepure, S., Marin, C., Fekete, A., Rajka, G., Brad, T., Samsudean, C. *Ecological assessment of water quality in relation to hydrogeology in a shallow urban aquifer: Somesul Mic River aquifer (North-Western, Romania).* European Geosciences Union (EGU) General Assembly 2014. Viena, Austria. 27 april - 2 may.

11. Khayet, M. *Use of osmosis technologies and their recent advances in education.* 8th International Technology, Education and Development Conference (INTED 2014). Valencia. 10 - 12 march.

12. Ortiz, J.M., Larrosa-Guerrero, A., Borjas, Z., Maneiro, E., Esteve-Nuñez, A. *Microbial Desalination Cell Using an Alternative Electron Acceptor in Cathode Chamber: experimental results and theoretical behaviour.* 2nd European Meeting of the International Society for Microbial Electrochemistry and Technology (EU-ISMET 2014). Alcalá de Henares, Madrid. 3 - 5 september.

13. Uclés, A., Hernando, M.D., Rosal, R., García-Calvo, E., Fernández-Alba, A.R. *Qualitative and quantitative analysis of poly(amidoamine) dendrimers in aqueous matrix by liquid chromatography–electrospray ionization-hybrid quadrupole/ Time-of-flight mass spectrometry (LC-ESI-QTOF-MS).* 10th Annual LC/MS/MS Workshop on Environmental Applications and Food Safety. Barcelona. 1 - 3 july.

patents fellowships

5.8. Patents

14. 1. Inventors: De MIguel, A., García-Calvo, E., De Bustamante, I. Proceso para el tratamiento de aguas procedentes de lodos bentoníticos. P201430558. Applicant: IMDEA WATER Foundation. Submission date:15 April 2014

5.9. 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

PhD thesis

5.10. PhD Thesis

Asymetric Capacitive Deionisation for water treatment applications. May 2014. Cum Laude
Julio José Lado Garrido

Economic policy instruments for sustainable water Management. Febraury 2014. Cum Laude
Carlos Dionisio Perez Blanco

Estimating evapotranspiration though scintillometry and remote sensing
Alberto de Tomás Calero

Quanawat in Alcalá de Henares
Enrique Fernández Tapias

Membrane Technology
Raquel García Pacheco

Economic instruments for Water Management
Estefanía Ibáñez Moreno

Horizontal Permeable Reactive Barriers for groundwater recharge with treated wastewater
María Leal Meca

Emerging contaminants and groundwater
María de la Virtudes Martínez Hernández

Ecological assessment of the subsurface water quality from the Hyporheic zone
Rubén Rasines Ladero

Drivers affecting the industrial structure of water and sanitation services
Marta Rodríguez Gómez

Toxic cyanobacteria from freshwater Systems. Molecular methods for their biological control
Mª Ángeles Lezcano Vega

Development of microbiol desalination cells
Zulema Borjas Hernández

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

Emerging compounds in reclaimed water in Canary Islands: evolution in soil and groundwater
Esmeralda Estévez Navarro

5.11. Internships

Student: Fernanda Milans
Research: Water Economy
Centre: Facultad de Ciencias Económicas y de Administración, Universidad de la República (Argentina)
Date: 1 March - 17 October

Student: Antoine Dubois du Bellay
Research: Hydrogeology, environment and energy
Centre: Université de Rennes 1 (France)
Date: 5 May - 5 August

Student: Vincent Brandon
Research: Bioelectrogenesis
Centre: University of New Mexico (U.S.)
Date: 9 May - 18 July

Student: Hope Elizabeth Lujan
Research: Bioelectrogenesis
Centre: University of New Mexico (U.S.)
Date: 9 May - 18 July

Student: Pia Christine Autsfeld
Research: Water footprint
Centre: TU Universität Bergakademie Freiberg (Germany)
Date: September

Students: Tadeusz Namiotko
Research: methods on hyporheic waters ecology as well as on morphometricgeometrics in shape analysis of biological objects
Centre: University of Gdansk (Poland)
Date: 21 Septembre - 1 October

5.12. Mobility

Predoctoral Researcher: Alberto Blanco González
Centre: University of Waterloo. Waterloo, Canada
Date: December 2013 – March 2014

Predoctoral Researcher: María Ángeles Lezcano Vega
Centre: Åbo AkademiUniversity. Turku, Finland
Date: 1 April-31 May

Researcher: Sanda Iepure
Centre: Scientific Station of Tarfala (Suede). International Network for Terrestrial Research and Monitoring in the Arctic. Stockholm University
Date: 9 - 28 July

Associated Researcher: Francisco javier Lillo Ramos
Centre: Scientific Station of Tarfala (Suede). International Network for Terrestrial Research and Monitoring in the Arctic. Stockholm University
Date: 9 - 28 July

R&D Manager: Juan Mª Sanz García
Centre: SOST-CDTI, Brussels.
Date: 1 October - 30 November

Predoctoral Researcher: María Ángeles Lezcano Vega
Centre: Proff. Andrew Jenkins Laboratory. Dpto. de Estudios de Salud y Medio Ambiente del Telemark University College. Bø, Norway
Date: 8-19 December

internships

mobility

5.13. RTD activities organization

1. Teaching itinerary: Geolodía 14: Salamanca "Un paseo desde el Río Águeda hasta los mares antiguos de la sierra". 10 May.

2. 2nd European Meeting of the International Society for Microbial Electrochemistry and Technology (EU-ISMET 2014). Alcalá de Henares, Madrid. 3 - 5 September.

3. Researcher's Nigth. 26 September
- "Bacterial producing electricity, older and new energy form".
- "Cyanobacteria-producers of toxins in Spanish Water".
- "Science and water in emergency situations".
- "Is there life underground?".
- "Your car and a F1: science and technology in XXI century".

4. II Simposium about Water management in protected areas. Natural Park Alejandro de Humboldt, Cuba. 20 - 25 October.

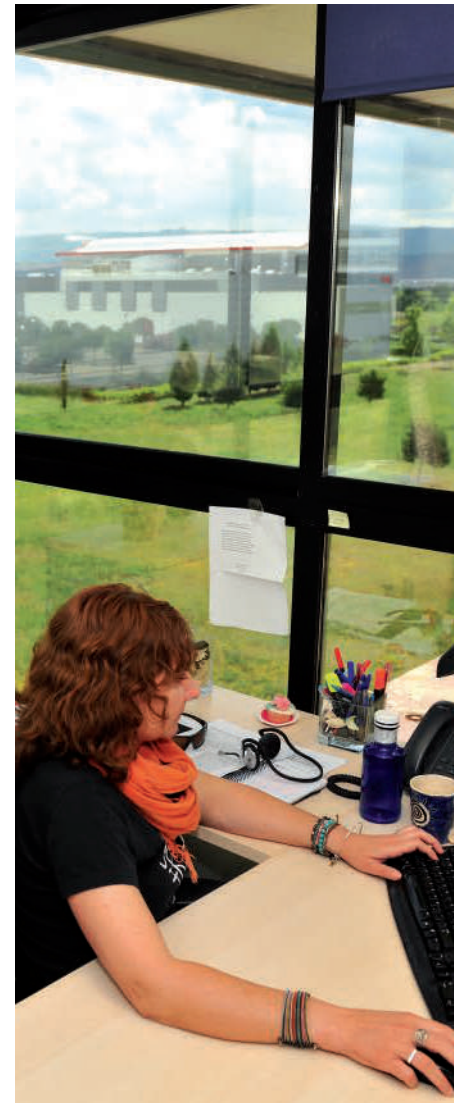
5. XIV Science Week (4 - 17 November):
- Teaching itinerary: "Groundwater and energy supply in the Madrid Community.
- Workshop: "Bacteria producing electricity: older and new energy form".
- "CPC de Majadahonda e instalación de microturbinas hidroeléctrica del Canal de Isabel II Gestión".
- "A todo riesgo: Convivir con los desastres geológicos cotidianos".

6. Seminar:"Prácticas para el manejo de micropipetas y pesaje". Metter Toledo Company. IMDEA Agua. Alcalá de Henares. 4 July.

7. Course: "Formación en espectrometría de MAsas LC/QTOF". ABSciex Company. Alcalá de Henares. 1-3 September.

8. Course: "Curso Teórico y práctico de PCR y qPCR". IMDEA Water. Alcalá de Henares. 14-17 October.

9. Course: "Formación del equipo de cromatografía de Gases Masas Triple Cuadrupolo (GC-MSMS TQ). IMDEA Water. 1 December



institutional activities

6

annual report 2014

6.1. Awards and Merits

- IMDEA Water was awareded with the medal of the Environmental Spanish Club (CEMA).

6.2. Collaboration

With Research Organizations

1. Universidad de Alcalá
2. Universidad Rey Juan Carlos
3. Institut de Ecologie Emile Racovitza
4. Gobierno de España – Ministerio de Medio Ambiente y Medio Rural y Marino – Confederación Hidrográfica del Duero
5. Centa – Fundación Centro de las Nuevas Tecnologías del Agua
6. FCIHS – Fundación Centro Internacional de Hidrología Subterránea
7. Universidad Zaragoza 1542
8. Universidad de Jaén
9. Gobierno de España – Ministerio de Economía y Competitividad – Instituto Geológico y Minero de España
10. Centro para el Conocimiento del Paisaje
11. Instituto Madrileño de Investigación y Desarrollo Rural, Agrario y Alimentario – Consejería de Economía e Innovación Tecnológica – Comunidad de Madrid
12. Fundación Mediterránea – Empresa Universidad de Almería
13. UNIPAZ – Instituto Universitario De La Paz
14. CSIC – Consejo Superior de Investigaciones Científicas
15. ECOVIDA – Centro de Investigaciones y Servicios Ambientales
16. Picos de Europa – Parque Nacional
17. 亚欧水资源研究和利用中心 – Arewmater
18. CIDERH
19. Centro Nacional de Artes Plásticas – CNAP
20. Universidad de Almería

21. UNIVERSIDAD COMPLUTENSE MADRID
22. UNED
23. UNIP UNIVERSIDADE PAULISTA
24.
25. Universidad del Valle · Cinara
26. UNIVERSIDAD DE MURCIA
27. ufisica
28. comap.ca collaborative geomatics
29. UNIVERSIDAD FRANCISCO DE VITORIA VINCE IN BONO MALUM

With Companies

1. Sadyt
2. PROINGESA PROYECTOS, INGENIERÍA Y GESTIÓN, S.A.
3. euroestudios Ingenieros de consulta
4. DAM Depuración de Aguas del Mediterráneo
5. JOCA
6. EDASU
7. PERGA INGENIEROS, S.L.
8. caasa tecnología del agua
9. EUROCONSULT
10. Consulnima Consultoría e Ingeniería Ambiental
11. GRUPO SOIL
12. aqualia
13. Grupo Wasser
14. Valoriza Agua
15. SULZER
16. innovati Innovación y Creatividad en TI

Member of

1. Renewable Heating & Cooling European Technology Platform
2. geoplat
3. IME
4. AEDyR Asociación Española de Desalación y Reutilización
5. Plataforma Tecnológica Española del Agua
6. Water Footprint
7. ASERSA Asociación Española de Reutilización Sostenible del Agua ¡Reutiliza Agua!
8. iberoaqua
9. Madrid Network
10. afre Asociación de Fabricantes para Agua y Riego Españoles
11. IWA International Water Association
12. Medio Ambiente Asociación Nacional GN Medio Ambiente

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. 14 Science Week. Madrid, Spain. 2014

- 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

graphic design
base 12 diseño y comunicación

D.L.
M-15.528-2015