



imdea water institute

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a n n u a l   r e p o r t

2013

f o r e w o r d

# foreword



**Eloy García Calvo**

Director, IMDEA water Institute

April 2014

a n n u a l   r e p o r t  
2013

In 2013, IMDEA Agua has taken a huge step forward towards consolidation. At the end of the year, we signed a contract of sale for a splendid building which will allow us to make all the mid- and long-term modern, spacious facilities available. This purchase includes an extensive plot, which will also permit possible extensions in the future.

This operation is a clear example of collaboration between Regional Government institutions to solve important problems by avoiding public debt, which is compulsory in times of crisis. We wish to express our gratitude to the Regional Ministries of Education, Youths and Sports, and Ministry of Economy and the Treasury for the facilities offered to complete this operation.

After adapting in previous years to the management difficulties that the economic crisis has brought, this year entailed the peculiarity of being a year of transition in European research financing programmes. The FP7 closed with consequent stoppages until Horizon 2020 started in the new year. Moreover, it was not possible to obtain the financing part not attainable in Europe from Spanish national research programmes. Fortunately, the efforts made by the Regional Government to increase any funding received has been a determining factor for scientific and technological production to grow. Despite six projects having finished this year, the efforts made by our researchers have also enabled the number of projects underway to be reduced only by two, which leaves 13.

Apart from the usual research results, such as scientific articles, communications in congresses, books and book chapters, which constantly grow and are of good scientific quality, 2013 stands out for the number of patents presented, five in all: one international, one European and three Spanish ones. Four of these patents are related to the water and energy nexus. Several groups are working on this nexus from different perspectives, and the intention is to reinforce these activity lines in the future.

Training activities continue, and there is much demand for master studies and to consolidate a doctoral programme in which the presentation of doctoral theses has begun with four this year.

We continue with our efforts to facilitate short stays in prestigious international research centres for our predoctoral researchers.

We are still concerned about quality management, which is reflected by us renewing the label of excellence in human resources management and in our attempts to obtain EFQM 300+ for the quality of our general management system.

Finally, I wish to thank all the members of our institute, our researchers and associate researchers, technicians, and administration and management staff, for their willingness and efforts to allow this exciting project, IMDEA Agua, to move ahead.

t a b l e o f  
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## 1.1. Presentation

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

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



*Photo 1. Headquarters*

## 1.2. Management structure

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

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

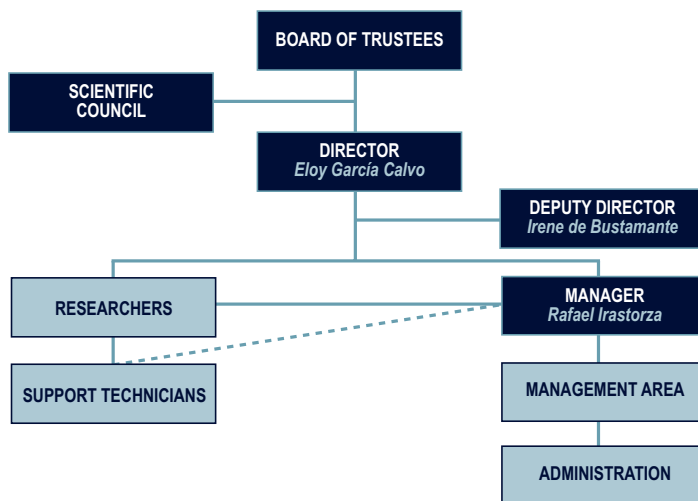


Figure 1. IMDEA Water management structure

## 1.3. Governing bodies

### 1.3.1. Board of Trustees

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

#### PRESIDENT

##### **Mr. Rafael Fernández Rubio**

*Dr. in Mining Engineering*

*Professor Emeritus of Madrid Polytechnic University. Spain*

*Rey Jaime I Prize for Environmental Protection*

*Doctor Honoris Causa of University of*

*Lisbon. Portugal*



## EX OFFICIO TRUSTEES (GOVERNMENT OF MADRID)

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### **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**

*General Director of University and Research Regional Board 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**

*Chief of Research Programmes. Sub Directorate of Research, Regional Board of Education, Youth and Sport Regional Government of Madrid. Spain*

## ELECTIVE TRUSTEES (INSTITUTIONAL MEMBERS)

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### **Mr. Juan José Vaquero**

*Full Professor of Organic Chemistry University of Alcalá. 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)

---

### **Mrs. Blanca Elena Jiménez Cisneros**

*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**

*Department of Chemical Engineering and Biotechnology Unit, Engineering Science Faculty. Ben-Gurion University of Negev. Beer Sheva. Israel*

## ELECTIVE TRUSTEES (EXPERT MEMBERS)

---

### **Mr. Manuel Ramón Llamas Madurga**

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

### **Mr. Adriano García-Loygorri**

*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 Corporate 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)

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### **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

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### **Mr. Alejandro Blázquez Lidoy**

### 1.3.2. Scientific Council

The Scientific Council is constituted as follows:

**Mr. Rafael Fernández Rubio**

*Dr. in Mining 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*



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## Projects

### 2.1. Urban and Industrial Wastewater Treatment

#### 2.1.1. 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.



#### 2.1.2. 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.



#### 2.1.3. 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.

#### 2.1.4. Elimination of sulfate in water by bioelectrogenic methods (BIO-S04)

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



#### 2.1.5. Wastewater Treatment by microbial bioelectrogenesis process (AQUAELECTRA)

<http://www.aquaelectra.es>

This collaboration project pursues three aims: to develop a natural wastewater purification system by means of bioelectrogenic wetlands; to establish an anaerobic bioelectrogenic treatment system for wastewaters and construct a bioelectrogenic removal system for nutrients (nitrogen). Bioelectrogenesis is a new process whereby determined bacteria can oxidise organic material and directly transfer the electrons generated to a conductive solid surface, such as graphite. This way, it is possible to generate and store clean energy. The use of aerobic microorganisms to remove organic matter from wastewaters is widespread, but entails two of the main problems currently associated with water treatments: the generation of biomass in the form of active sludge and the high energy cost of supplying oxygen to the biological system. The use of microbial anaerobic metabolism in water treatments is proposed as a viable alternative due to the lower biomass yield in these biological processes (less sludge produced) and the possibility of generating biogas (methane) that may be used as fuel for thermal and electrical energy generation. Methane presents the drawback that it is a greenhouse gas, even more toxic than CO<sub>2</sub>. In this sense, bioelectrogenesis offers the alternative of replacing methane generation by the production of clean electrical energy in the treatment plan.



#### 2.1.6. Madrid Advanced Wastewater Treatment Network with Non-Biodegradable Pollutants (REMTAVARES 2) <http://www.remtavares.es/>

REMTAVARES 2 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: adsorption, hydrodechlorination, advanced oxidation (Fenton, ozonation and photocatalysis), catalytic wet oxidation and catalytic oxidation in supercritical conditions.







## 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 (NANOQUAL)

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.

### 2.4.2. An integrated assessment of anthropogenic pollutant levels and their ecological impact on river basins. A study of the Henares River Basin. (INTEGRATOR)

As a result of the participation in the TRAGUA project it was found that the effectiveness of the WWTPs is limited because of the large number of pollutants such as pharmaceuticals, personal care products, additives, etc. Therefore, reasonable doubts surface at various points concerning the threats to water safety levels and the actual eco-impact achieved: (I) seasonal drought scenarios (II) local impacts (III) the presence of specific compounds at high concentrations. These points are of especial relevance considering the Directive 91/271 and the Directive 2000/60 (WFD), because its full implementation is to ensure that all waters in the EU achieve good ecological status by 2015.

This project seeks an integrated understanding of these concerns using the study of the Henares River as a model. This project covers: (a) a space-time water-monitoring program in connection with Points I-III. The program includes the evaluation of aprox. 150 anthro-



pogenic pollutants selected as being relevant, as well as an ecological status evaluation of water bodies based on studies with macroinvertebrate communities, (b) an assessment of the predicted river flow by evapotranspiration studies, both short and medium term, considering climate change models and (c) the selection and evaluation of one advanced tertiary treatment, determining its potential application and need for implementation.

### 2.4.3. Reactive Transport Modeling

The objective of Imdea –Agua is to obtain a better comprehension of the processes affecting contaminants in groundwater. Reactive transport modeling is an useful tool for the understanding and description of the movement and fate of contaminants as solutes in groundwater. The application of numerical models to field site and laboratory experiments allow the investigation of the contaminant transport under the influence of a variety of interacting processes, including advection, dispersion and chemical reactions.



## 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. Analysis of Economic Instruments for Water Management

Evaluation of effectiveness of economic instruments in integrated water policy (EPI-Water)

<http://www.feem-project.net/epiwater/index.html>

Economic policy instruments (EPI) have received widespread attention over the last three decades, and have increasingly been implemented to achieve environmental policy objectives. However, whereas EPI have been successfully applied in some policy domains (such as climate, energy and air quality), their application to tackle water management issues (drought/water scarcity, floods, water quality control) is beset by many practical difficulties.

Using a common multi-dimensional assessment framework, to compare the performance of single economic instruments with alternative policy instruments and baseline scenarios. In particular:





- Analysing the extent to which economic instruments contribute to achieving water policy goals (e.g. good ecological status of water bodies, flood protection, reducing risk and uncertainty in water availability), either directly (via changing use/consumption behaviour) or indirectly (via raising financial resources for implementing water policy protection measures);
- Analysing the efficiency implications of economic instruments, or to what extent they contribute to an optimum allocation and use of water resources (or goods and services provided by aquatic ecosystems), also in situations in which not all use- and non-use values are known or fully accounted for.
- Pinpointing the preconditions for economic instruments (or group of instruments) to be workable, effective and/or efficient in given socio-economic, hydrological, cultural and institutional conditions in Europe, whether in isolation or in combination with command and control mechanisms.
- Identifying remaining research and methodological issues that need to be addressed, in particular with regard to the further development and use of national accounting to support the design, implementation and evaluation of EPI in the field of water management.

### 2.5.3. 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.

### 2.5.4. Smart Prices and Drought Insurance Schemes in Mediterranean Countries. (SPADIS) <http://www.eip-water.eu/working-groups/spadis-smart-prices-and-drought-insurance-schemes-mediterranean-countries-ag014>

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.

#### 2.5.5. 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.

#### 2.5.5. “Cascade Flushing Flow Programme based on the analysis, integration and modelling of both physical processes and economic parameters of the river basins draining into the Ribarroja Reservoir (River Ebro) SICMEC”

The main goal of the project is to develop a Cascade Flushing Flow Programme (‘SICMEC’) based on the analysis, integration and modelling of both physical processes and economic parameters of the river basins draining into the Ribarroja Reservoir (River Ebro). The SICMEC represents the starting point for restoration of the hydrosedimentary dynamics of the highly regulated rivers Segre and Cinca and, consequently, optimise the flushing flow programme of the Lower River Ebro that has been operational since 2002. We propose: (i) to design experimental releases from the main reservoirs in these two catchments, (ii)



to continue the experimental flushing flow releases in the lower Ebro, and (iii) to examine natural floods that occur during the course of the project. We propose to use economic evaluation methodologies and cost-efficiency analysis, integrated within River Basin Management Plans. Finally, we will develop a decision support tool based on the integration of physical and economic elements. As it will be built around environmental effectiveness and cost-benefit criteria, this tool will allow the evaluation and comparison of different flushing flow options in the rivers Segre, Cinca and lower Ebro. We intend that SICMEC will serve as a tool to transfer methodologies and results to other drainage basins in the Iberian Peninsula and also to other Mediterranean catchments.

## 2.6. Membrane Technology

The IMDEA Water membrane research group is 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, nanofibrous 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).

The group is also developing research on the characterization, fouling and effectiveness of different cleaning treatments of commercial membranes. In addition, the group develops theoretical models of transport phenomena through membranes and for separation processes. Water treatment plants are optimized considering the water production rate, the quality of produced water and the energy consumption.

## 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 applying 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 IMDEA-Water is to improve the understanding of the function and dynamics of cyanobacteria in fresh water bodies used for potable water. We combine traditional tools (such as cultivation and measurements of key physiological processes) together with modern molecular techniques (functional genomics, molecular detection and quantification) in a comprehensive approach to tackle the problem of eutrophication and cyanobacterial blooms.

Currently, we are focused on developing molecular tools for the detection of toxic cyanobacteria in Spanish water reservoirs, and the application of such tools as an early warning system.

## 2.10. Climate Change

### 2.10.1. Methodologies for calculating evapotranspiration: scintillometry and remote sensing

Dealing with water scarcity is nowadays one of the most important issues worldwide. In arid and semi-arid regions, irrigation water consumption becomes especially critical. Accurate estimates of crop evapotranspiration can help to regulate this water consumption.

We are currently carrying out an investigation on the estimation of evapotranspiration in the Henares river basin (Madrid-Spain). The aim is to develop a methodology for accurately estimating evapotranspiration through remote sensing, by relating satellite imagery with scintillometer ground measurements. Using a scintillometer we can gauge the sensible heat flow over a surface, from which it is possible, at the same time, to calculate the current evapotranspiration through a surface energy balance and the other components also measured (net radiation and soil heat flow).

### 2.10.3 Assessment of heavy precipitation and droughts in central Spain

Climatic and hydrological extremes frequently cause high losses. Due to climate change, it is likely that climate extremes will have the greatest impact on human society in the future. This project investigates on the statistical modeling of extremes, such as heavy precipitation and droughts in central Spain. Here extreme value theory (EVT) is applied. The adequate description of the characteristics of extremes is a necessary prerequisite to assess their change. One main topic of the project is the joint modeling of extremes in a region. This reduces uncertainty and allows for the estimation of regional extremal dependence. Indices are derived from the statistical model in order to estimate the fragility of the region. Those indices serve to summarize information. According research questions are, for example: If one site experience losses due to heavy precipitation, how many other sites in the region are expected to suffer damage as well? The project results may serve for water management purposes.



### 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 Photovoltaics

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

## Contracts

- Framework Contract to provide services to support the development and implementation of EU Freshwater Policies **DG ENVIRONMENT (European Commission)**.
  - Potential for growth and job creation through the protection of water resources, with a special focus on the further implementation of the Water Framework Directive and Floods Directive.
  - Potential for stimulating sustainable growth in:
    - a. the water industry sector including investment in water supply and sanitation infrastructure in the EU.
    - b. the marine sector by increased protection of the marine environment- input to the European Semester.
  - And job creation through the protection of water resources, with a special focus on the further implementation of the Water Framework Directive and Floods Directive.
  - Support to the various Water Framework Directive Common Implementation Strategy (CIS) Groups.
- Project – Atmospheric Precipitation- Protection and efficient use of Fresh Water Integration on Natural Water Retention Measures in river basin management. **DG ENVIRONMENT (European Commission)**.
- Framework Contract. Targeted Economic Analysis on Water Resources Management Issues. **The 2030 Water Resources Group (IFC, World Bank Group)-WEF (World Economic Forum)**
- 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 Law. **FAO**
- Advice to World Bank and the Govern of Chile to the water resources modernization. **World Bank**
- Design and improvement of wastewater treatment on a diary industry. **SELERGAN, S.A.**
- Hydrological, environmental, economic, social and ethical aspects of consumption of groundwater reserve in Spain. Groundwater Mining in Spain, (MASE). **AQUALOGY and Universidad Politécnica de Cataluña.**
- Economic Analysis of the Guadalquivir stuary river management. **World Wildlife Fund.**





# human resources



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# 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](http://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.cnrkop.es](http://www.cnrkop.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.

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. Amadeo Rodríguez

Fernández-Alba

Researcher

Head of the Department of Management and Regulation of Point and Diffuse Pollution of IMDEA Water. He obtained his PhD on Chemical Sciences from the University of Granada and is Chair Professor at the Chemical Department of the University of Almería (UAL).

His most outstanding research lines are currently the development and application of effective new analytical methodologies in determining emerging contaminants in water by

advanced analytical techniques (GC-MS/MS, GCxGC-TOF-MS, LC-QTRAP-MS/MS, LC-QTOF-MS...), the development of analytical methods for pesticides in food, etc..

He has participated in more than 36 research projects funded by both public and private entities and has negotiated more than 230 contracts and agreements for R&D. He has a large number of publications (182) and scientific-technical documents to his name.

He has been lecturing and participating in PhD courses at the University for 28 years. He has also been directed or assisted on summer courses and masters organised by the University of Almería, the Complutense University of Madrid and the University of Alcalá. He has guided 10 PhD theses and holds three patents.

He also has proven experience in organising scientific-technological conferences and seminars as well as in R&D management.





**Dr. Pedro Letón García**  
Associated Researcher

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

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

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



**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. 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 Affairs, 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. Shivanand Teli

Researcher

Graduated with B.Sc in Chemistry (2001) and M.Sc in Polymer Chemistry (2003) from Shivaji University, Kolhapur (MH), INDIA. He joined as Doctorate Student in Jan 2004 in same department and university and received his doctorate degree in September 2007.

During his Ph.D, he was awarded departmental research scholarships (DRFs). Upon completion of his doctorate degree, he worked as a Research Associate (RA) in Chemical Engineering Department, Indian Institute of Technology (IIT), Kanpur INDIA. While working in IIT, he received a post-doctorate offer from Research Institute for Agriculture and Life Science, Seoul National University, South Korea in 2008. After completion of his one-year tenure, he was awarded a Brain Korea Fellowship sponsored by the South Korean government and joined the Department of Energy Engineering Science at Hanyang University Seoul, South Korea (2009). He currently works as a Marie Curie Research Fellow at IMDEA Water, University of Alcalá de Henares (Madrid), Spain.

His primary research was into sulphonated polymer synthesis for water desalination and for separation of liquid-liquid mixtures. He has worked on reverse osmosis (RO), UF, MF, PV and ED etc. and has published several articles in scientific journals, as well as conference proceedings covering some 15 sources.

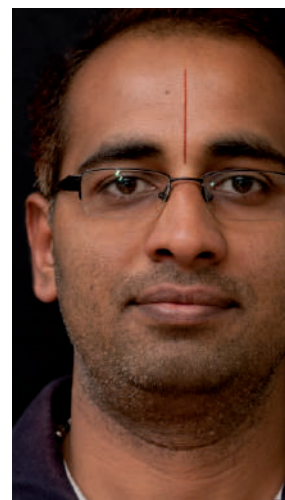
### Dr. N. Sridhara Chary

Researcher

Masters degree in Environmental Science and Technology with distinction in the year 2000 from Jawaharlal Nehru Technological University (JNTU), India. He pursued his doctoral studies on the fate, mobility, risk assessment, human exposure studies and remedial methods of heavy metal pollutants in industrially contaminated sites. His doctoral research was carried out at the Indian Institute of Chemical Technology (IICT) and he received his PhD in 2005 from JNTU, India. Soon after this, he was selected for the Research Associate position of CSIR and pursued the same at IICT. During this period he was offered a postdoctoral position by the French National Institute of Agricultural research (INRA), France. Later, he worked as postdoctoral associate at the National Taiwan University, Taiwan.

His general research interest lies in the area of Environmental monitoring and risk assessment studies with respect to anthropogenic pollution of both inorganic and organic pollutants, with emphasis on the determination of emerging contaminants in the environmental matrix. His research currently focuses on volatile organics in the environmental matrix with particular interest on development of new methods using advance mass spectrometry techniques.

He has 26 research papers 2 review articles in peer reviewed journals and a text book chapter to his credit, in addition to many conference contributions. He has also written popular science articles for the science and technology sections of leading newspapers.







**Dr. Leonor Nozal Martínez**  
Quality Management  
and Laboratories

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.



**Julio José Lado Garrido**  
Predoctoral Researcher

**Degree** in Chemistry from Alcalá University. Spain.

**MSc** in Hydrology and Water Resources at Alcalá University and Rey Juan Carlos University, Madrid. Spain.

**Research:** Asymmetric Capacitive Deionisation for water treatment applications.

**Raquel García Pacheco**  
Predoctoral Researcher

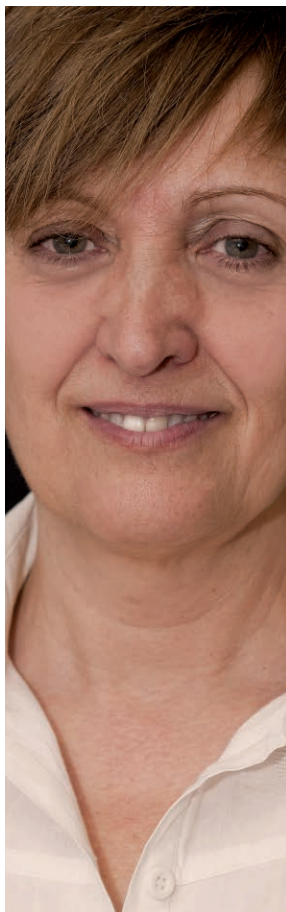
**Degree** in Chemical Engineering from Rey Juan Carlos University. Madrid. Spain.

**MSc** in Hidrology and Water Resources Management at Alcalá University, Madrid. Spain.

**Research:** Membrane Technology.



# 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 aquifers 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.

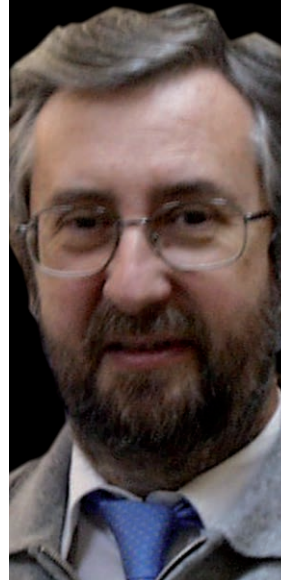


**Dr. José Luis Corvea Porras**  
Researcher

PhD in Environmental Sciences by the University of Alcalá, (approved as PhD in Pedagogical Sciences by the Cuban Ministry of Higher Education). Professor and member of the Academic Committees of the Master in Environmental Management and the Master in Agroecology (University of Pinar del Rio, Cuba).

He has experience in the management of National Parks and he has participated in several research and international cooperation projects. He has published several papers and reports related to the educational management of water resources, the dissemination and the knowledge of the hydrogeological heritage and, it is worth pointing out its participation in several national and international congresses. He has been teaching and researching for 20 years and also organizing R+D activities.

His current research focuses on the management of wastewater treatment system and natural protected areas.



**Dr. Manuel Segura Redondo**  
Associated Researcher

He has a PhD in Geological Sciences from the Complutense University of Madrid (1982) and he is Professor since 1989, linked to the Department of Geology at the University of Alcalá. His research began in 1974 within the Stratigraphy Area, having participated in more than 20 research projects funded public organisms, (7 of them as Principal Investigator), authored and co-authored over 100 articles and chapters book in specialized journals (30 of them SCI publications) and directed three doctoral theses. His main research focuses on the Upper Cretaceous of the Cordillera Ibérica, conducting studies of sedimentary basin analysis, sequence stratigraphy, sedimentology and cyclicity. He has organized the Fourth Geological Congress in Spain, Editor of the Geological Society of Spain and President of the Royal Spanish Society of Natural History. He is currently Professor Emeritus at the University of Alcalá.





**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. Javier Gil Gil**  
Associated Researcher

Graduated in Geological Sciences (1992) and has a PhD in Geological Sciences from the Complutense University of Madrid (2002). He has developed his professional career, first as a project geologist in private companies and from 1998 as professor in the Department of Geology at the University of Alcalá. Since 2003, he is Professor in the area of Stratigraphy.

His research focuses on the high resolution stratigraphic and cyclostratigraphic analysis of meso-Cenozoic successions of the Iberian Peninsula and Balearic Islands. He has participated in 10 competitive research projects (2 as principal investigator) and co-authored over 50 scientific publications (12 of them in SCI journals). He is currently coordinator of the research group IBERCRETA (CCTE2007-R23, University of Alcalá).



**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 and editor. Within her expertise she has been 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 Panels: 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 Edinburgh; Ministère de l'Ecologie, France. Member of Water Resources Projects, Paris; GRAPHIC/UNESCO Programme. Committee Member.





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. 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

**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 Department" 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.

**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.



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

# 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-Shehawey**  
Researcher

PhD in Microbiology in 2001 from the University of Bayreuth, Germany. She carried out her doctoral research on nitrogen fixation and cell differentiation in cyanobacteria and got

In 2001, she moved to Stockholm University to work as a postdoctoral fellow and later on as an assistant professor and a group leader. As a postdoctoral fellow, her research focused on the filamentous bloom-forming *Trichodesmium* sp., which is a significant nitrogen fixer in tropical and subtropical oceans. Later as a group leader, she directed her research to focus on studying the bloom-forming toxic cyanobacterium *Nodularia spumigena* that dominates the annual summer blooms in the Baltic Sea.

She has authored and co-authored eighteen original research articles for international peer-reviewed journals, which also includes two review articles and one book chapter. She acted as a referee for several high impact journals and she has presented her research at several international conferences. As a main academic supervisor, she graduated one PhD thesis and two MSc theses. She has successfully collaborated on both the national (Swedish) and international levels.





**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 career 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).





**Sara Tejedor Sanz**  
Predoctoral Researcher

**Degree** in Chemical Engineering from University Complutense of Madrid. Spain.

**MSc** in Hidrology and Water Resources Management at Alcalá University and Rey Juan Carlos University, Madrid. Spain.

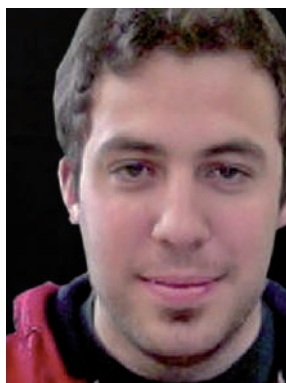
**Research:** Wastewater Treatment by microbial electrogenesis process.

**M<sup>a</sup> 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.



**Alejandro Reija Maqueda**  
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:** Wastewater treatment using natural purification systems (NPS): bioelectrogenic wetlands.

**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.



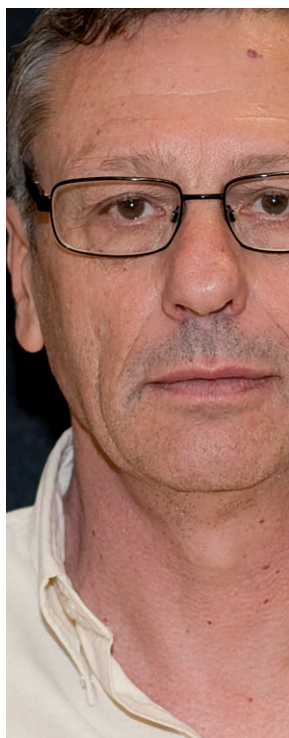
**Rubén Rasines Ladero**  
Predoctoral Researcher

**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.

# water and climate change



**Dr. Pedro Berliner**  
Adjunct Researcher

Professor at the Blaustein Institute for Desert Research, Ben Gurion University of the Negev in Israel, teaching courses related to agrometeorology and the use of marginal waters as part of the Hydrology and Dryland Agriculture graduate student programmes. He spent his sabbatical year at IMDEA from April 2009 to March 2010 and is currently Adjunct Senior Scientist at IMDEA, collaborating in developing and heading the "Sustainable Management of Water Bodies" Department in which the efficient use of recycled sewage water in agriculture, is being addressed. He has published more than fifty articles in international peer reviewed journals and ten chapters in books on topics related to the efficient use of water in agriculture, and supervised more than thirty M.Sc. and Ph. D. Students. He was a visiting Professor at CIDESON, Mexico (1994-95) and at the Desert Research Institute, Univ. of Tottori, Japan (2001-02). He is a member of the Israeli delegation to the UNCCD (Convention for Combating Desertification), Israel's Ministry of Science representative to the ESF COST programme (domain: forests, products and services), and was one of the leading scientists that took part in a Middle East multilateral watershed and water resource management project, administered by the World Bank and various other international forums. He has led competitively funded research projects in Southern Africa, Kenya, Uzbekistan, Kazakhstan, Turkmenistan, India and Argentina. These projects were funded by the US AID, BMBF (Germany), GPM EU and Argentina's CONICET among others.

His research areas are the mass and energy balances in the biogeosphere interface, and their dependence on the movement of water in the soil-plant-atmosphere continuum. One of the topics of special interest is the role played by the direct evaporation of water from the soil surface, in the presence or absence of plants, on the dissipation of solar energy. The use of remote sensing tools to assess the spatial distribution of these phenomena, their modelling and the expected effect of climate change on them are also among his research topics. Over the last twenty years he has paid special attention to the generation and efficient use of rainfall generated runoff for the irrigation of crops and forest, and developed the runoff agroforestry systems concept, which is particularly well adapted to arid land regions in the developing world.

**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.

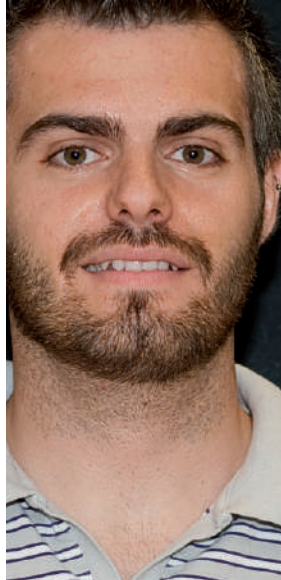


### Dr. Malaak Kallache

Researcher

She obtained her PhD on trends and extreme values of river discharge time series from the University of Bayreuth, Germany, in 2007. She also worked at the the Potsdam Institute for Climate Impact Research (Germany). From 2008 to 2010 she was experienced researcher for the Marie Curie research network NICE at the LSCE-IPSL in Gif-sur-Yvette, France. Her research interests lie mainly in the fields of data analysis of hydro-meteorological data, extreme value analysis, stochastic modeling, Bayesian model combination, downscaling, and vulnerability assessment.

She has published more than 8 papers in international peer-reviewed journals and books. Dr. Kallache has presented in numerous international scientific workshops. Furthermore, she refereed for various high impact journals. In addition, she was involved in the organization of a scientific conference and a scientific workshop, which was dedicated to the training of young researchers. She has past and ongoing international collaborations (especially in Germany and France).



### 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

Junior 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 taught 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.



**Carlos Dionisio Pérez Blanco**  
Predoctoral Researcher

**Degree** in Economic Sciences

**MSc** in Applied Economic Analysis, Alcalá University-Complutense University of Madrid and master's degree in Development Economics and International Co-operation, Rome University.

**Research:** Economic policy instruments for sustainable 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.

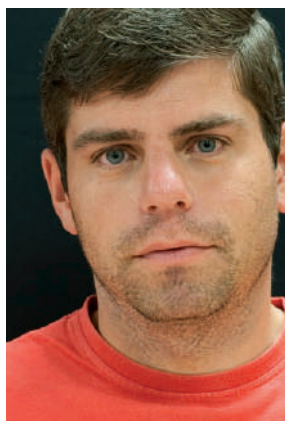


# laboratory technicians

**David Solé Fernández**

Senior Laboratory Technician

Degree in Chemistry from Alcalá University. Madrid.



**Sonia Herrera López**

Senior Laboratory Technician

Degree in Chemistry from University of Almería, Spain.



**Francisco Martínez Serrano**

Laboratory Technician

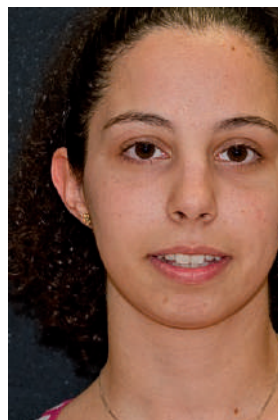
IVT: Environmental Chemistry.



**Carolina Guillén Fuentes**

Laboratory Technician

IVT: Control and Analysis.  
IVT: Environmental Chemistry.



**Amaya Romero Salas**

Laboratory Technician

IVT: Control and Analysis.



# 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





# infrastructure and scientific equipment



- 4.1. Water Analysis Laboratory [46]
- 4.2. Water Biology Laboratory [47]
- 4.3. Geomatics Laboratory [47]
- 4.4. Soil Laboratory [48]
- 4.5. Water and Energy Laboratory [49]

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## 4.1. Water Analysis 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.

### Microcontaminants

The main equipment is for chromatography, both gas and liquid, coupled with mass spectrometry high resolution (HR):

- Bidimensional gas chromatography coupled with a mass spectrometer with flight time detector (GCxGC/TOF) with an automatic multi-injection system 7890 (Agilent Technologies).
- Gas chromatography coupled with a triple quadrupole mass spectrometer (GC/MS/MS), 7700 (Agilent Technologies)
- Liquid chromatography coupled with mass spectrometer high resolution (LC-/QTOF) 5600 (AB Sciex) and LC/TOF (Agilent Technologies) for determining mass errors of less than 3 ppm.

The advantage of mass spectrometry high resolution with respect to the low resolution is the accuracy and precision of mass, due to their higher performance analyzers, quadrupole-time of flight (TOF and QTOF). These allow the identification of the exact mass of a compound.

- High Liquid Chromatography coupled to Ultraviolet Visible (HPLC-UV), 1200 (Agilent Technologies)
- Mass Spectrometry with Inductively Coupled Plasma (ICP-MS) 7700 (Agilent Technologies)
- Instrumentation required for carry out the samples treatments, such as liquid liquid phase extraction (LLE), solid phase extraction (SPE), acid digestion by microwave.

### Membrane Technology

- 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)





### Basic Analysis

This laboratory performs analysis of different physical-chemical and microbiological parameters described in the water quality control regulations.

The main equipment:

- Ionic Chromatography (IC) coupled to detection by conductivity for analysis of anions and cations, 861 Avanced Compact (Metrohm).
- 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. Water Biology 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, Alphamager
- Real Time PCR machine, AB7300
- Nano-photometer, Epoch
- Gel Electrophoresis Equipment
- PCR Thermocycler

### 4.3. 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



#### 4.4. 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/°C) (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

#### 4.5. Water and Energy Laboratory

##### Manufacturing

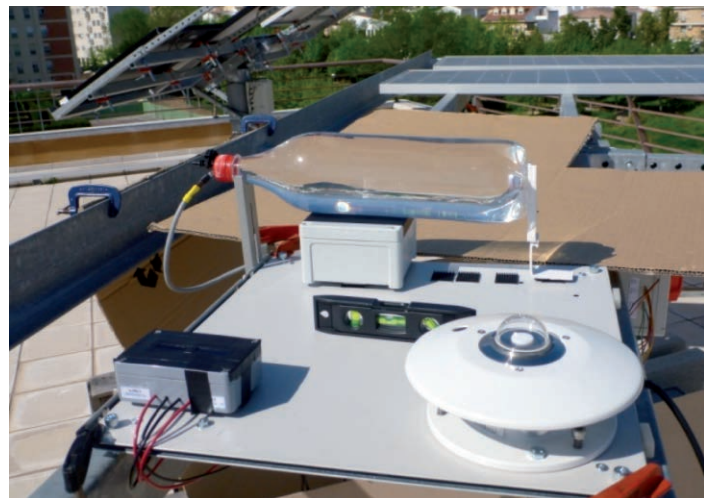
- Soldering station, vacuum pumps and chambers for cell encapsulation with silicone

##### 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

5

- 5.1. Scientific Papers [51]
- 5.2. Lectures [58]
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- 5.10. RTD activities organization [65]
- 5.11. Academic Activities [65]

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## 5.1. Scientific Papers

### Articles in Journals

1. Arsuaga, J.M., Sotto, A., Del Rosario, G., Martínez, A., Molina, S., Teli, S.B., De Abajo, J. (2013) *Influence of the type, size, and distribution of metal oxide particles on the properties of nanocomposite ultrafiltration membranes*. Journal of Membrane Science, 428. pp. 131-141.
2. Boltes, K., Alonso del Águila, R., García-Calvo, E. (2013) *Effect of mass transfer on biodesulfurization kinetics of alkylated forms of dibenzothiophene by Pseudomonas putida CECT5279*. Journal of Chemical Technology & Biotechnology, 88 (3). pp. 422-431.
3. Campo, E., Lezcano, M.A., Agha, R., Cirés, S., Quesada, A., El-Shehawy, R. (2013) *First TaqMan Assay to Identify and Quantify the Cylindrospermopsin-Producing Cyanobacterium Aphanizomenon ovalisporum in Water*. Advances in Microbiology, 3 (5). pp. 430-437.
4. Corvea, J.L., Blanco, A., De Bustamante, I., Farfán, H., Martínez-Maqueira, Y., Novo, R., Díaz-Guanche, C., López, N. (2013) *Advances in Geoconservation in Cuba: Assessment of the Guaniguanico Range and Guanahacabibes Plain (Pinar del Río)*. Geoheritage. pp. 1-16. ISSN 1867-2477.
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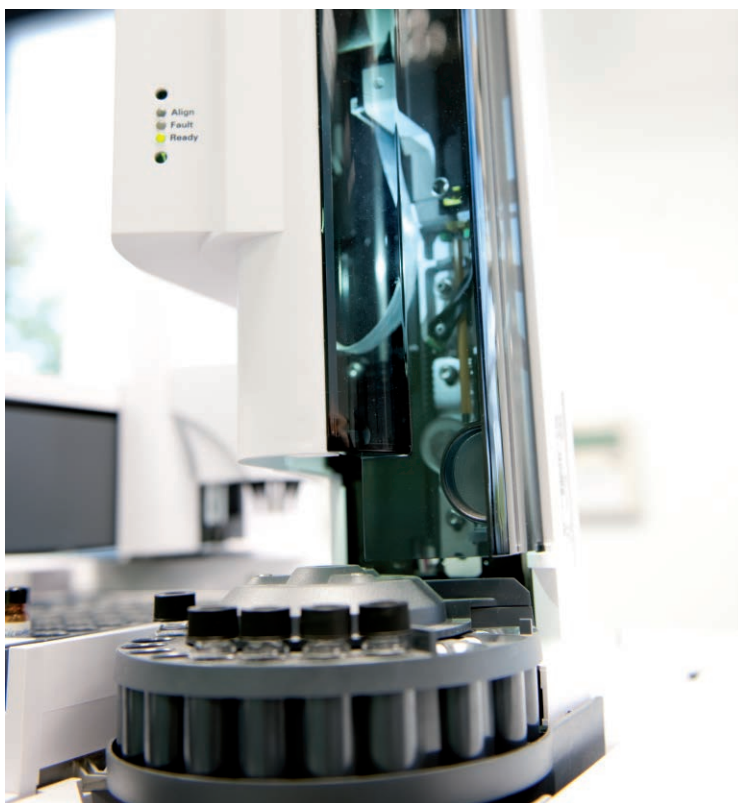
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## 5.2. Lectures

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7. Esteve-Núñez, A. Domesticating Geobacter to perform electrosynthesis by stimulating the elector-accepting capacity. Society for Industrial Microbiology and Biotechnology SIMB 2013. San Diego, USA. 11 - 14 August 2013.
8. Esteve-Núñez, A., Larrosa-Guerrero, A. Biología de los reactores bioelectroquímicos: microorganismos electrógenos, y mecanismos de transferencia de electrones. Seminario Básico sobre Reactores Bioelectroquímicos. University of León. León, Spain. 14 November 2013.
9. Esteve-Núñez, A. Avances en la aplicación de la Bioelectrogénesis en el tratamiento del agua residual urbana. IX Jornadas Técnicas de Saneamiento y Depuración. "Investigación e Innovación Tecnológica en el tratamiento de las aguas residuales urbanas". Consejería de Agricultura y Agua, Región de Murcia; ESAMUR (Entidad de Saneamiento y Depuración de la Región de Murcia). Murcia, Spain. 20 - 21 November 2013.
10. Fuentes, M., Vivar, A. Low Cost Dataloggers to Monitor PV Systems: Quality Controls. International Centre for Solar Energy. Konstanz, Germany. 8 August 2013.
11. García-Calvo, E. La explotación racional de los recursos hídricos. Encuentro. 4295. Recursos y residuos: hacia una nueva cultura. Cursos de Verano 2013. Universidad Internacional de Andalucía. Málaga, Spain. 3 - 5 July 2013.
12. García-Calvo, E. Emerging pollutants in water. WSDAC, Belgrade-Servia; UNESCO's Division of Water Sciences; UNESCO's International Hydrological Programme. Center for Water for Sustainable Development and Adaptation to Climate Change (WSDAC). Belgrade, Republic of Serbia. 9 - 10 July 2013.



13. García-Calvo, E. La reutilización como nueva fuente de agua: Algunas experiencias en España. XXVIII Congreso Centroamericano de Ingeniería Sanitaria y Ambiental. "Hacia la Sostenibilidad Sanitaria y Ambiental en la Prestación de los Servicios de Agua Potable y Saneamiento". Tegucigalpa, Honduras. 1 - 4 October 2013.

14. Gómez, C.M. Economic Policy Instruments for Addressing Water Scarcity and Droughts. Belpasso International Summer School in Environmental and Natural Resource Economics. Sicily, Italy. 1 - 7 September 2013.

15. Gómez, C.M. Smart Pricing and Drought Insurances Schemes in Mediterranean Countries. EIP Water Annual Conference. Brussels, Belgium, 21 November 2013.

16. Gómez, C.M. Water scarcity and droughts: governance failures and economic solutions. Oxford Water, Oxford University. Oxford, United Kingdom. 26 November 2013.

17. Gómez, C.M. Presentation of the EPI Water final report. Lunchbox seminar. OCDE, Paris, France. 12 December 2013.

18. Solanes, M. El acaparamiento del agua y el de tierras. 8º Foro Agua para el Desarrollo. Fundación Canal. Madrid, Spain. 5 June 2013.

19. Vivar, M., Fuentes, M. Integration of Solar Photovoltaic in Solar Water Treatment Technologies in Developing Countries - Hybrid Systems and Clean Water Sensors. International Centre for Solar Energy. Konstanz, Germany. 8 August 2013.

### 5.3. Oral Communications

1. Corvea, J.L., Farfán, H., Díaz, C., Blanco, A., De Bustamante, I. El Sistema Nacional de Áreas Protegidas (SNAP). Escenario principal para la geoconservación en Cuba. Caso de estudio: Geosistema GUANIGUANICO-GUANAHAACABIBES. VIII Congreso sobre Áreas Protegidas. IX Convención Internacional sobre Medio Ambiente y Desarrollo. Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA). Havana, Cuba. 8 - 12 July 2013.

2. Esteve-Nuñez, A. BACWIRE project: Bacterial wiring for energy conversion and bioremediation. Nano- and membrane-based systems for water treatment. 3rd Dissemination Workshop of the Nano4water Cluster. Dresde, Germany. 17 - 24 April 2013.

3. Esteve-Nuñez, A. Full scale demonstration of a hybrid MET-constructed wetland for urban wastewater treatment: The AQUAELECTRA project. MFC4 - 4th International Microbial Fuel Cell Conference". Cairns, Australia. 1 - 4 September 2013.

4. Esteve-Nuñez, A. Microbial exocellular electron transfer: The art of deconstructed microbial redox cuisine. 64th Annual Meeting of the International Society of Electrochemistry. Santiago de Querétaro, Mexico. 8 - 13 September 2013.

# oral communications

5. González-Naranjo, V., Leal, M., De Miguel, Á., Martínez-Hernández, V., Lillo, J., De Bustamante, I. (2013). Evolución de las propiedades de un suelo de cultivo regado con agua regenerada. XI Jornadas de Investigación en la Zona no Saturada del Suelo (ZNS 13). Escuela Politécnica Superior de la Universidad de Santiago de Compostela. AGAIA (Asociación Gallega de Investigadores del Agua). Lugo, Spain. 6 - 8 November 2013.

6. Pérez-Blanco, C.D. ¿Cuánto vale el agua? Modelo Input-Output para el cálculo de la productividad sectorial del agua. El caso de Castilla y León. IV Jornadas de Jóvenes Investigadores de la Universidad de Alcalá. Alcalá de Henares, Madrid, Spain. 28 - 30 November 2013.

7. Pérez-Blanco, C.D., Gómez, C.M. Insuring water: A practical risk management option in water scarce and drought prone regions? Frontiers in Economics of Natural Hazards and Disaster Risk Reduction - Financing Disaster Risk Reduction and Climate Adaptation. Belpasso, Italy. 1 - 7 September 2013.

8. Pérez-Blanco, C.D., Gómez, C.M. Myths and Maths of Water Efficiency: An Analytical Framework to Assess the Real Outcome of Water Saving Technologies in Irrigation. 87th Annual Conference of the Agricultural Economics Society. Warwick, United Kingdom. 8 - 10 April 2013.

9. Pérez-Blanco, C.D., Gómez, C.M. Simple myths and basic maths about greening irrigation. 5th EAAE PhD Workshop. Lovaina, Belgium. 29 - 31 May 2013.

10. Pérez-Blanco, C.D. Water pricing and water saving. Insights from a Revealed Preferences Model in a Mediterranean basin. Encuentro: Instrumentos económicos para la gestión del agua en España. Alcalá de Henares, Madrid, Spain. 20 - 21 June 2013.

11. Pérez-Blanco, C.D., Thaler, T. A general equilibrium model for the assessment of water productivity dynamics. A case study of Casti-

le and León Region (Spain). Envecon 2013: Applied Environmental Economics Conference. Londres, United Kingdom. 15 March 2013.

12. Pérez-Blanco, C.D., Thaler, T. Water flows in the economy. An input-output framework to assess water productivity in the Castile and León Region (Spain). New Directions in the Economic Analysis of Water. Lisbon, Portugal. 18 - 19 June 2013.

13. Solanes M. Water and Development in Latin America: Rights, Markets, Economic Context and Institutional Requirements. Presentación de la publicación Water Trading and Global Water Scarcity. Zaragoza, Spain. 1 March 2013.

## 5.4. Poster

1. Blanco, A., Bustamante, I., Corvea, J.L., Pascual, J.A. (2013). El patrimonio geológico y el agua: Componentes claves para la conservación en los espacios naturales protegidos. X Reunión Nacional de la Comisión de Patrimonio Geológico. Sociedad Geológica de España (Comisión del Patrimonio Geológico), Instituto Geológico y Minero de España. Segovia, Spain. 10 - 15 June 2013.

2. Corvea, J.L., Blanco, A., De Bustamante, I. El agua como objeto transversal de gestión. Metodología para el Inventario de Recursos Asociados al Agua (IRAA) en áreas protegidas. VIII Congreso sobre Áreas Protegidas. IX Convención Internacional sobre Medio Ambiente y Desarrollo. Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA). Havana, Republic of Cuba. 8 - 12 July 2013.

3. Corvea, J.L., Martínez, Y., Blanco, A., De Bustamante, I. La participación comunitaria como elemento clave en la gestión: Parque Nacional viñales. Cuba. VIII Congreso sobre Áreas Protegidas. IX Convención Internacional sobre Medio Ambiente y Desarrollo. Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA). Havana, Republic of Cuba. 8 - 12 July 2013.



water





4. De Tomás, A., Nieto, H., Berliner, P., Salas, J. Studying evapotranspiration at different scales. 4th European Space Agency Advanced Training Course in Land Remote Sensing. Athens, Greece. 1 - 5 July 2013.
5. De Tomás, A., Berliner, P. (2013). Monitoring aerodynamic temperature on a crop field. Tübingen Atmospheric Physics Symposium "Scintillometers and Applications". Tübingen, Germany. 7 - 9 October 2013.
6. Iepure, S., Rasines-Ladero, R., Carreño F., De Bustamante, I. (2013). Ostracoda as proxy for the environmental monitoring of shallow subsurface habitats in a contaminated detrital aquifer from central Spain. 17th International Symposium of Ostracoda "Back to the Future". Rome, Italy. 23 - 26 July 2013.
7. Lezcano, M.A., Agha, R., Quesada, A., El-Shehawy, R. (2013). Biodegradación de microcistinas en el embalse de San Juan (Madrid, España). III Congreso Ibérico de Cianotoxinas (3 CIC). Blanes, Spain. 10 - 12 July 2013
8. Leal, M., Martínez-Hernández, V., Lillo, J., Meffe, R., de Bustamante, I. (2013). Zeolite in horizontal permeable reactive barriers for artificial groundwater recharge. European Geosciences Union (EGU) General Assembly 2013. Vienna, Austria. 7 - 12 April 2013.
9. Leal, M., Meffe, R., Lillo, J. (2013). Preliminary results of column experiments simulating nutrients transport in artificial recharge by treated wastewater. European Geosciences Union (EGU) General Assembly 2013. Vienna, Austria. 7 - 12 April 2013.
10. Martínez-Hernández, V., Meffe, R., Herrera, S., De Bustamante, I. (2013). Sorption-desorption and biodegradation of pharmaceutical compounds from reclaimed water in sediments. 8th Micropol & Ecohazard. Zurich, Switzerland. 16 - 20 June 2013.
11. Ortiz, J.M., Larrosa-Guerrero, A., Borjas, Z., Esteve-Núñez, A. (2013) Desalinización de aguas salobres empleando celdas microbianas: estudio del rendimiento en diferentes condiciones de operación. XXXIV Reunión del Grupo de Electroquímica de la RSEQ (GE-RSEQ) y el XV Encuentro Ibérico de Electroquímica. Valencia, Spain. 15 - 17 July 2013.
12. Ortiz, J.M., Larrosa-Guerrero, A., Borjas, Z., Esteve-Núñez, A. (2013) Mathematical modelling for optimizing the performance of a Microbial Desalination Cell. 4th International Microbial Fuel Cells Conference. Cairns, Queensland, Australia. 1 - 4 September 2013.
13. Ortiz, J.M., Larrosa-Guerrero, A., Borjas, Z., Maneiro, E., Esteve-Núñez, A. Bio-electrochemical technology for simultaneous waste water treatment and desalination of brackish water. Chem H2O: Sustainable Water Management 2013. Madrid, Spain. 1 - 2 October 2013.
14. Rasines-Ladero, R., Iepure, S., Carreño, F., De Bustamante, I. (2013). Subsurface crustacean communities as proxy for groundwater-surface water interactions in the Henares and Tajuña Rivers floodplains, central Spain. European Geosciences Union (EGU) General Assembly 2013. Vienna, Austria. 7 - 12 April 2013.

## 5.5. Patent

1. Inventors: Michel, T., Irabien, J.A., Domínguez, A., García-Calvo, E., Urtiaga, A.M. Procedimiento integrado de electro-oxidación fotovoltaica para la depuración y reutilización de aguas residuales urbanas. P201130364. Applicant: Sociedad General de Aguas de Barcelona, S.A. Spanish Patent. Concession date: 30 August 2013

2. Inventors: Esteve, A., Berná, A., Reija, A., Salas, J.J., Pidre, J.R., Aragón, C.A. Método de tratamiento de aguas residuales: Biofiltro conductor de la electricidad para la depuración de aguas residuales. PCT/ES2013/070153. Applicant: EUROESTUDIOS, S.L., Fundación IMDEA Agua, Fundación CENTA. Submission date: 2013

3. Inventors : Vivar, M., Fuentes, M. Sensor para la determinación de la calidad del agua y presencia de microorganismos. EP 13179906.6. Applicant: Fundación IMDEA Agua. Submission date: 2013

4. Inventors: Salas, J.J., Pidre, J.R., Aragón, C.A., Esteve-Núñez, A., Tejedor, S., Berná, A., López-Martínez, A. Sistema bioelectroquímico para depurar aguas residuales con cátodo de esferas conductoras flotantes. P201331937. Applicants: Fundación CENTA, Fundación IMDEA Agua, JOCA Ingeniería y Construcciones, S.A. Submission date 2013

5. Inventors: Salas, J.J., Pidre, J.R., Aragón, C.A., Esteve-Núñez, A., Tejedor, S., Berná, A., Pastor, L. Procedimiento para la eliminación bacteriana de nitrato en aguas residuales y sistema biológico electrogénico. P201331936. Applicants: Fundación CENTA, Fundación IMDEA Agua, DAM Depuración de Aguas del Mediterráneo. Submission date: 2013

## 5.6. Fellowships

**María de las Virtudes Martínez Hernández**

**Research:** Emerging contaminants and ground-water

**Category:** Support Research Fellowship

**Fund:** Scientific and Technological Research Regional Plan



**José Ángel Gómez Martín**

**Category:** Technology Transfer Technician

**Fund:** Spanish Ministry of Economy and Competitiveness



**Sonia Herrera López**

**Category:** Senior laboratory technician

**Fund:** Spanish Ministry of Economy and Competitiveness



**Marta Vivar García**

**Category:** Researcher from National Science Programme Juan de la Cierva

**Fund:** Spanish Ministry of Economy and Competitiveness



patents

fellowships

## 5.7. PhD Thesis

**Water Footprint as an ecological indicator: Application to Duero River Basin and Spanish pork Industry.**

November 2013. Cum Laude.

Ángel de Miguel García

**The synergy effects in ecotoxicological analysis of ibuprofen. Quantitative approximation of the environmental risk.** October 2013. Cum Laude.

Victor González Naranjo

**Estimating evapotranspiration through 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

**Asymmetric Capacitive Deionisation for water treatment applications**

Julio José Lado Garrido

**Horizontal Permeable Reactive Barriers for groundwater recharge with treated wastewater**

María Leal Meca

**Emerging contaminants and groundwater**

María de la Virtudes Martínez Hernández

**Economic policy instruments for sustainable water Management**

Carlos Dionisio Perez Blanco

**Ecological assessment of the subsurface water quality from the Hyporheic zone**

Rubén Rasines Ladero

**Wastewater Treatment using Natural Purification Systems (NPS) bioelectrogenic wetlands**

Alejandro Reija Maqueda

**Drivers affecting the industrial structure of water and sanitation services**

Marta Rodríguez Gómez

**Wastewater Treatment by microbial electrogenesis**

Sara Tejedor Sanz

**Toxic cyanobacteria from freshwater Systems. Molecular methods for their biological control**

M<sup>a</sup> Ángelez Lezcano Vega

**Development of microbial 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)**

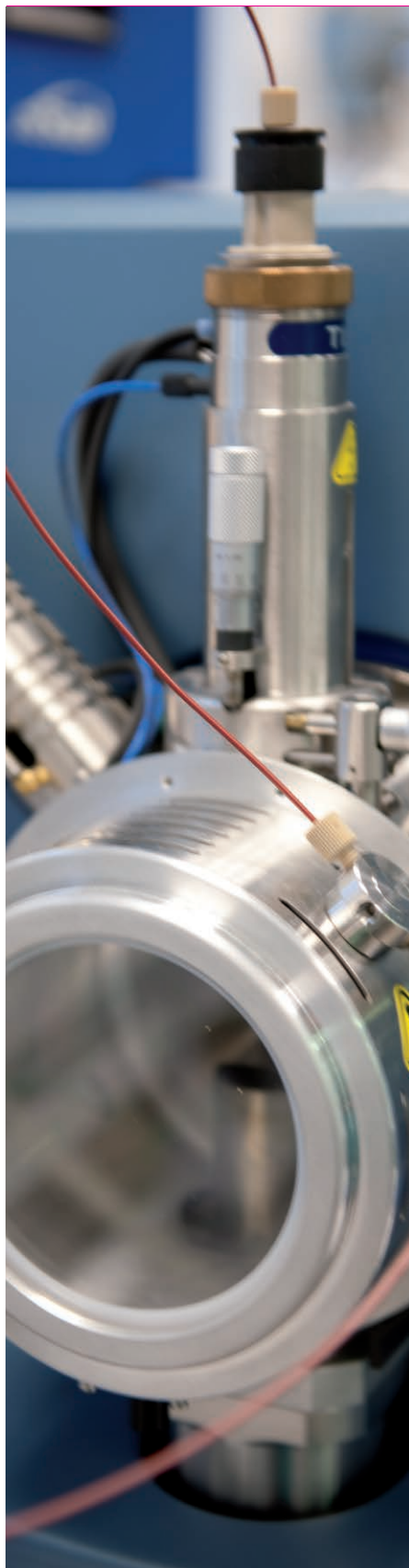
Alberto Blanco González

**Emerging compounds in reclaimed water in Canary Islands: evolution in soil and groundwater**

Esmeralda Estévez Navarro

# PhD thesis





## 5.8. Internships

**Student:** Keyla Eugenio Cruz

**Research:** Análisis de la calidad de una comunidad mazateca con fines de saneamiento y remediación

**Centre:** Autónoma Benito Juárez University, Oaxaca, Mexico

**Date:** February - June 2013

**Student:** Rogerio C. Traballi

**Research:** Utilization of sewage sludge in Brazil

**Centre:** Universidades Paulista, Sao Paulo

**Date:** January 2013

**Student:** Carlos Roberto Ramos da Silva

**Research:** Utilization of sewage sludge in Brazil

**Centre:** Universidades Paulista, Sao Paulo

**Date:** January 2013

**Student:** David Nortes Martín

**Research:** Elaboración de estudio de evaluación empírica del riesgo de sequía hidrológica en las cuencas españolas

**Centre:** Alcalá University

**Date:** From April 2013

## 5.9. Mobility

**Predocctoral Researcher:** Julio José Lado Garrido

**Centre:** University of Wisconsin, Madison, USA

**Date:** February - December 2013

**Predocctoral Researcher:** Alberto de Tomás Calero

**Centre:** Danish Hydraulic Institute (DHI)

**Date:** June - August 2013

**Predocctoral Researcher:** Alberto Blanco González

**Centre:** University of Waterloo, Waterloo, Canada

**Date:** December 2013 - March 2014

**Visiting Fellowship Programme Predocctoral Associated Researcher:** Carlos Mario Gómez Gómez

**Centre:** Oxford University, U.K.

**Date:** October - December 2013

# internships

# mobility



## 5.10. RTD activities organization

1. 2nd FP7 EPI-Water Conference: Anticipating the Performance of Economic Policy Instruments (EPIs) in Water Management. Alcalá de Henares, Madrid, Spain. 6 - 8 February 2013.
2. IMDEA Water was visited by a delegation of representatives of the Chinese Innovation Agency (TORCH) and technologies companies in that country under the "2nd China-Spain Innovation Partnership Development Forum" CDTI and TORCH. 29 May 2013.
3. Conference "Instrumentos económicos para la gestión del agua en España". Projects EPI Water and Water Cap and Trade. Alcalá de Henares, Madrid. Spain. 20 - 21 June 2013.
4. UAH Summer Course: "Nuevas tendencias en el tratamiento biológico de aguas residuales: Agua y energía". IMDEA Water, General Foundation of the UAH and Aqualia. Alcalá de Henares, Madrid. Spain. 24 - 26 June 2013.
5. Chem H2O 2013, Leading-Edge Conference on Sustainable Water Management: Chemical Industry setting the pace. Organized by ANQUE and DECHEMA, with the participation of IMDEA Water in the 4th Session: New Water Resources: Reclamation, Recycling, Reuse and Desalination. Madrid. Spain. 1 - 2 October 2013.

6. IMDEA Water participated in the Researchers Night with 3 activities. 27 September 2013:
  - "Science and water in emergency situations"
  - "Bacteria producing electricity: older and new energy form"
  - "Science in your living room"

7. IMDEA Water participated in the XIII Science Week with 2 activities. 4 - 17 November 2013:
  - Workshop: "How do our habits affect over aquatic organisms?". 6 November 2013
  - Teaching itinerary: "Groundwater and energy supply in the Madrid Community". 14 November 2013
  - Workshop: "Bacteria producing electricity: older and new energy form". 13 November 2013.

## 5.11. Academic Activities

1. University of Alcalá Summer Course: "Nuevas tendencias en el tratamiento biológico de aguas residuales: Agua y energía". Alcalá de Henares, Madrid. Spain. 24 - 26 June 2013.
2. Seminar "Addressing the link between the environment and macroeconomics: main issues and challenges ahead". ACTeon, Colmar, Francia. 26 - 27 August 2013.
3. Course "Introduction to the R Software". IMDEA Water, Alcalá de Henares, Madrid. Spain. 11 February - 6 March 2013.

## academic activities





# i n s t i t u t i o n a l a c t i v i t i e s



- 6.1. Awards and Merits [67]
- 6.2. Collaboration [67]
- 6.3. Institutional Activities [70]

a n n u a l   r e p o r t  
2013

## 6.1. Awards and Merits

- WaterSense Project was awarded with special mention by the European Projects Agency (EPA), under the World Congress of Research and Innovation, because of its efficiency in the dissemination of the project through MyEuropa. 6 June 2013.
- Biodegradación de microcistinas en el embalse de San Juan (Madrid, España), poster with special mention by Valoralia Enterprise, shown in the III Iberic Congress of Cyanotoxins (3 CIC). Blanes, Spain 10 -12 July 2013.
- VIII Social Council Prize to Knowledge Transfer University-Society (UAH), to C.M. Gómez Gómez for his work “Activity results as a specialist in water economy. Alcalá de Henares, Madrid. Spain. September 2013.
- Faculty Members of the Belpasso International Summer School in Environmental and Natural Resource Economics. Sicily, Italy. 1 - 7 September 2013.
- The International Association of Hydrogeologists (IAH-GE Spanish Group) granted the “Award for Professional career in Hydrogeology and its Application in Spain”, in its 2013 edition, to Rafael Fernández Rubio, President of Institute IMDEA Water Board of Trustees. October 2013.

## 6.2. Collaboration

### With Research Organizations



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## With Companies

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## Member of

1.   
World Water Council
2.   
International Water Association
3.   
EWP  
The Voice of Water
4.   
Sustainable Solutions for a Thirsty Planet®
5.   
IRHC Renewable Heating & Cooling  
European Technology Platform
6.   
geoplq
7.   
Instituto Mediterraneo de Estudios Avanzados  
Instituto Mediterraneo de Estudios Avanzados  
Mediterranean Water Institute  
Acadèmia de l'Aigua  
مؤسسة احياء المياه المتوسطية  
Mediterranean Water Institute
8.   
ASOCIACIÓN ESPAÑOLA DE  
DESALACIÓN y REUTILIZACIÓN
9.   
PLATAFORMA TECNOLÓGICA  
ESPAÑOLA DEL AGUA
10.   
Water Footprint
11.   
ASERSA  
Asociación Española  
de Reutilización  
Sostenible del Agua  
¡Reutiliza Agua!
12.   
iberoaqua
13.   
Madrid Network
14.   
afre ASOCIACIÓN DE  
FABRICANTES  
PARA AGUA Y RIEGO  
ESPAÑOLES
15.   
IWA International Water Association
16.   
Medio Ambiente  
Asociación Nacional CN Medio Ambiente



### 6.3. Institutional Activities

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



- Member of Research Laboratories Network (REDLAB).
- Participation. 13 Science Week. Madrid. Spain. 2013
- Participation in the UAH International campus of excellence.
- Member of Euraxess Service Network. Local Contact Point



- Member of working group 3 "Setting standards for shallow geothermal energy" of AENOR.
- Participation. Blog el agua. Madrid. REMTAVARES Project.





editor  
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graphic design  
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D.L.  
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