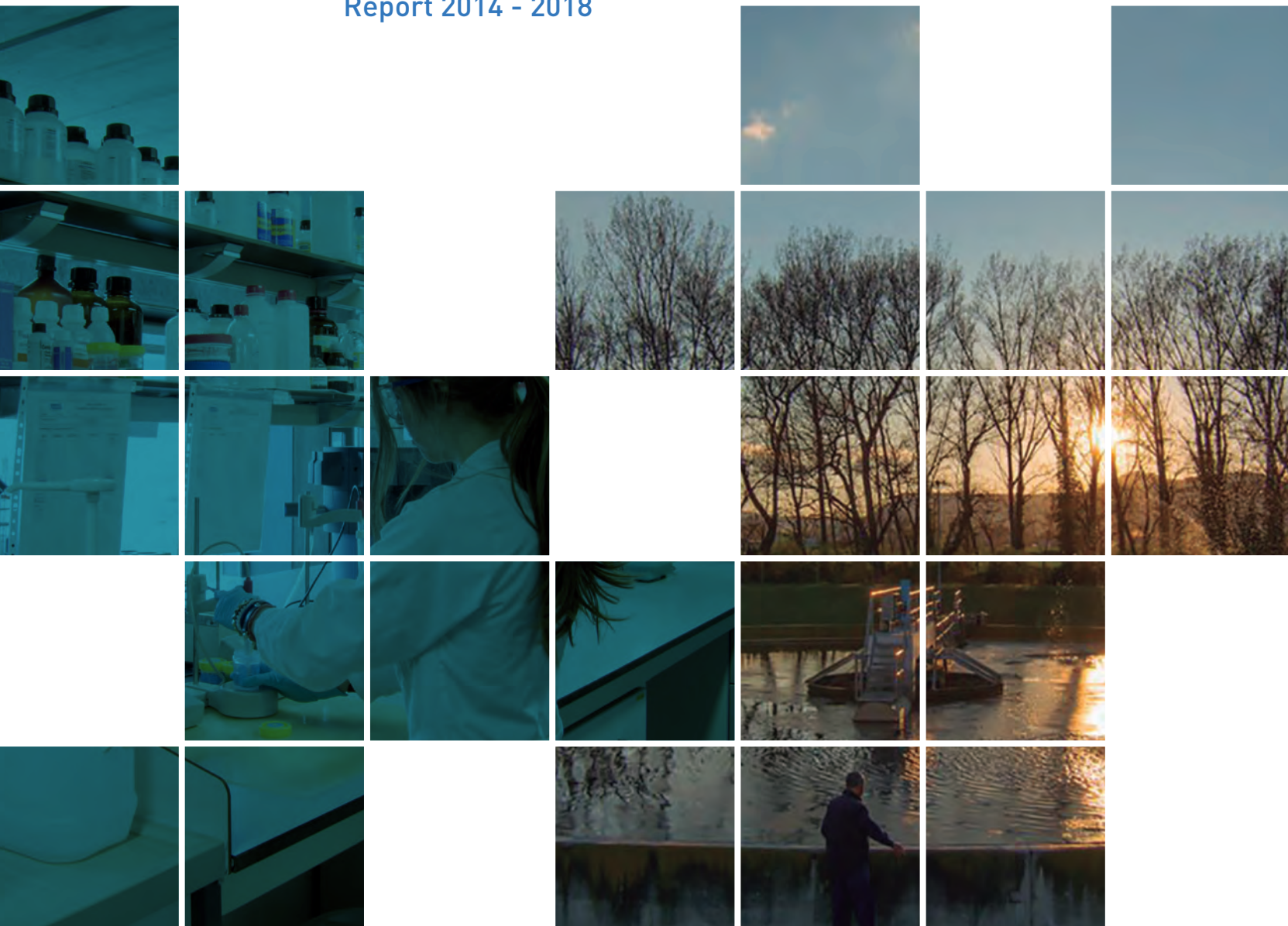


ECO-INNOVATIVE ENVIRONMENTAL SOLUTIONS

® **lequia**
UdG

Report 2014 - 2018



Dr Jesús Colprim Galceran

LEQUIA Group Leader 2013-2018

j.colprim@lequia.udg.cat



INTRODUCTION

This report comes at a particularly auspicious time. From a personal point of view, it covers the most part of my work at LEQUIA as group leader. I had the honour of assuming this responsibility in June 2013 and it is precisely now that I hand over to Dr Manel Poch – who could not have led the group better from 1995 to 2013, and also happened to be my thesis supervisor. As for LEQUIA, 2018 is a special year in the history of our group. Although we were officially founded in 1992, it was one year later that we started to operate as a real research group with clear goals and interests. To mark such a notorious date, the 25th anniversary, we will hold a special workshop in 2019.

Looking back, it can be concluded that the core of LEQUIA has remained unchanged since its inception. We still carry out basic and applied research on water sciences and environmental biotechnology and engineering. However, our work has clearly become more collaborative and more international. Within Catalonia, we maintain strategic ties with the Catalan Institute of Water Research and in the past five years have built links with other UdG research groups on microbiology, analytical chemistry and environmental physics. Furthermore, we have actively participated within the RIS3CAT WATER community, leading one of the projects (DEGESTAKE) and participating in one more (REGIREU). As for internationalisation, in 2017 European projects accounted for more than 50% of competitive research funds and two projects starting early in 2019 have partners from such distant countries as China or Egypt. As for the next years, in 2020 we will host and organize the EU-ISMET conference, which will bring together researchers from European countries working on microbial electro-technologies.

This multidisciplinary and global dimension has doubtlessly enhanced our research performance and put us at the forefront of research in the water and environmental biotechnology and engineering fields. Nevertheless, the mission of university research groups such as ours in the 21st century must have a broader scope than labs or scientific journals and conferences. We must ensure that our research findings and discoveries are transferred to society in a responsible way and that they contribute to meeting its needs. Thus, we have undertaken several public awareness activities and our involvement in programmes such as Marie Skłodowska Curie European Industrial Doctorate networks, TECNIOspring or AGAUR industrial doctorates, has significantly increased.

Being LEQUIA group leader for the past five years was an enjoyable and challenging experience. I will be delighted to continue contributing to the coming challenges as researcher.

Sincerely,





WHO WE ARE

The Laboratory of Chemical and Environmental Engineering (LEQUIA) is a research group of the University of Girona (UdG) devoted to the development of eco-innovative environmental solutions.

LEQUIA is part of UdG's Institute of the Environment (IMA) and participates actively in the Euro-Mediterranean Campus of Tourism of Water Campus of International Excellence (e-MTA).

LEQUIA is recognised by the Catalan Agency for Management of University and Research Grants (AGAUR) as a "consolidated research group" and has been granted with TECNIO quality seal, which distinguishes the leading experts in applied research and technology transfer in Catalonia.

The team

LEQUIA has a team of 30 people, including university professors, postdoctoral and predoctoral researchers, and technical and management support staff. Because our work is multidisciplinary, LEQUIA projects often involve environmental scientists, chemists, biologists, engineers and computer scientists.

Research lines

- > Innovative bioprocesses for treatment, resource recovery and synthesis of new products
- > Physicochemical advanced processes for treatment and/or reuse of liquid and gas side streams
- > Planning, control and evaluation of complex environmental systems

Projects

Research activity is carried out with funds from national and international R&D projects, and technology transfer contracts with public and private organisations. Between 2014 and 2016, LEQUIA had an average turnover of 1.3 million euros (of which, 16% came from private funds).

Post-graduate education

LEQUIA has always played an active role in postgraduate and doctorate programs of the University of Girona, such as the Master in Water Resources and the Doctorate Programme in Water Science and Technology. The group coordinated Marie Curie Integrated Training Network SANITAS (FP7) and was partner of Marie Skłodowska Curie European Industrial Doctorate Network TreatRec (Horizon 2020).

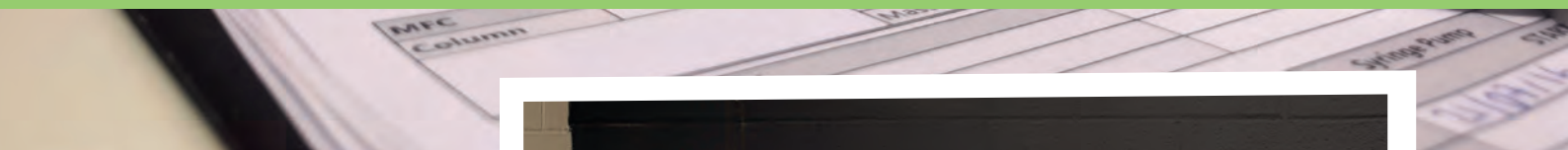
Quality Certification

LEQUIA has a quality assurance management system certified by the Catalan Agency for Enterprise Competitiveness (ACCIÓ) and based on ISO 9000 standards and the EFQM excellence model.





FACILITIES



⬆ Laboratory of research,
Advanced oxidation and adsorption systems



Laboratory of chemical analysis. ⬆

The group is based in the Faculty of Sciences of the UdG Montilivi Campus and a 550m² area in the Jaime Casademont building of the UdG's Science and Technology Park. Available facilities include:

- > Fully instrumented pilot plants with different configurations for wastewater treatment at laboratory and semi-industrial scale.
- > Instruments to follow-up and control wastewater treatment plants.
- > Analytical chemistry laboratory with generic and specific equipment for water characterization.
- > Photoreactors for advanced oxidation processes.
- > Software for environmental modelling and life cycle assessment studies (LCA).
- > Access to the UdG's technical services, including analytical techniques such as ICP-MS, RMN, elemental analysis, XRD, XRF, SEM and TEM microscopy, GC-MS, HPLC, MS and TGA.



Laboratory of chemical analysis [↗](#)



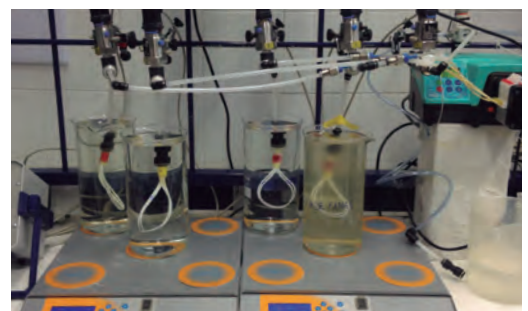
Pilot plants - Membrane Bioreactors [↗](#)



Pilot plants - bioelectrochemical systems [↗](#)



Pilot plants - Membrane Bioreactors [↗](#)



Pilot plants - Drinking water treatment systems [↗](#)



> Permanent staff

January 2019



Dr Manel Poch Espallargas

Full university professor and Group Leader

manel@lequia.udg.cat
ORCID: 0000-0002-2563-059X

Development and application of decision support systems in the field of environmental technology. Sustainable management of

conventional and advanced wastewater collection and treatment systems. River basin management. Selection and operation of natural systems for wastewater treatment. Urban water cycle integrated control (sewer system, sewage treatment plant, river).



Dr M. Dolors Condom Balaguer

Full university professor and LEQUIA Group Co-Leader

marilos@lequia.udg.cat
ORCID: 0000-0001-6231-2163

Advanced biological technologies for urban and industrial wastewater treatment mainly for nutrients removal. Operation of

bioelectrochemical systems (BES) to treat domestic and industrial wastewater and polluted groundwater. Microbial electrolysis cells (MFC) to produce added value products from carbon dioxide emissions.



Dr Joaquim Comas Matas

Tenured university professor

Joaquim.Comas@lequia.udg.cat
ORCID: 0000-0002-5692-0282

Multicriteria decision support tools for environmental systems. Advanced modelling and control and sustainable assessment of urban water systems. MBR,

integrated membrane systems and forward osmosis for wastewater treatment and water reuse. Membrane recycling. Removal of micropollutants. Nature-based solutions to foster circular economy in cities.



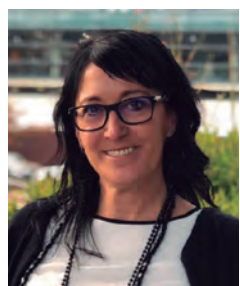
Dr Jesús Colprim Galceran

Tenured university professor

J.Colprim@lequia.udg.cat
ORCID: 0000-0002-6000-069X

Resource recovery from wastewaters. Struvite recovery from digested sludges. Partial nitrification/anammox processes. Aerobic granular sludge. Sludge reduction by decoupling

oxidation-reduction metabolism. Bioelectrochemical systems (BES) for wastewater treatment, nitrate removal, CO₂ capture and transformation to valuable products. Biological syngas fermentation to produce butanol.



Dr Maria Martín Sánchez

Tenured university professor

maria@lequia.udg.cat
ORCID: 0000-0003-2917-5691

Use of sewage sludge as adsorbent/catalyser for odour-causing compounds removal. Development of new adsorption and regeneration techniques through

advanced oxidation processes for liquid and gaseous effluents. Removal of siloxanes and trace compounds in biogas.



Dr Sebastià Puig Broch

Associate professor Serra Húnter

sebastia@lequia.udg.cat
ORCID: 0000-0003-2995-1443

Microbial electrochemical technologies for 1) biofuels and platform chemical production from wastes (liquid and gas-phase) and 2) bioremediation of contaminated

waters (electro bioremediation). Macronutrients (nitrogen, phosphorous and potassium) recovery from wastewater.



Dr Ignasi Rodriguez-Roda Layret

Full university professor

Ignasi@lequia.udg.cat
ORCID: 0000-0002-8989-9061

Membrane bioreactors and forward osmosis. Municipal wastewater and greywater treatment technologies. Micropollutants removal. Water

reuse. Nature-based solutions. Sewer mining. Environmental Decision Support Systems.



Dr Marta Verdaguer Planas

Tenured university professor

marta.verdaguer@lequia.udg.cat
ORCID: 0000-0001-8673-9866

Research topics: Decision Support Systems (EDSS) applied to environmental domains. Integrated management of urban water cycle (sewer systems, wastewater treatment plant and receiving waters).

Adaptation and application of combinatorial optimisation metaheuristics (ant colony optimisation) to environmental problems.

> Senior / Postdoctoral researchers

January 2019



Dr Gaëtan Blandin

Postdoctoral researcher
gaetan.blandin@lequia.udg.cat
ORCID: 0000-0002-0144-1014

Research topics: Membrane processes for desalination, water reuse and nutrients recovery. Forward osmosis. Osmotic membrane bioreactor.



Dr Pau Batlle Vilanova

Part-time assistant professor
pau.batlle@lequia.udg.cat
ORCID: 0000-0002-3287-7195

Research topics: Bioelectrochemical conversion of carbon dioxide. Optimization of wastewater and sludge treatment. Biogas upgrading technologies applied to wastewater treatment plants.



Dr Raquel García Pacheco

TECNIOSPRING+ and Marie Skłodowska Curie fellow (project Mem 2.0)

raquel.garcia@lequia.udg.cat
ORCID: 0000-0002-5203-3723

Research topics: End-of-life reverse osmosis membrane recycling; Integration of recycled membranes in water processes; Decision making tools.



Dr Alba Cabrera Codony

TECNIOSPRING+ and Marie Skłodowska Curie fellow (project SilCap)

alba.cabrera@lequia.udg.cat
ORCID: 0000-0002-4057-8697

Research topics: Adsorption and advanced oxidation processes for gas, air and water treatment; Photocatalytic oxidation for indoor air purification; Biotechnologies for biogas upgrading.



Dr Albert Magrí Aloy

Postdoctoral researcher
albert.magri@lequia.udg.cat
ORCID: 0000-0002-6993-0746

Research topics: Nutrient removal and recovery from wastewaters, anaerobic digestates, and other organic waste streams. Livestock manure management and treatment. Anammox-based processes.



Dr Albert Vilà Rovira

Postdoctoral researcher
albert.vila@lequia.udg.cat
ORCID: 0000-0002-3379-6346

Research topics: Computational fluid dynamics (CFDs) applied to wastewater systems for the reactor design and scale up. This has been applied to several technologies such as biological nutrient removal, bioelectrochemical systems and forward osmosis.



Dr Narcís Pous Rodríguez

Postdoctoral researcher
narcis.pous@lequia.udg.cat
ORCID: 0000-0003-2034-1251

Research topics: Development of Microbial Electrochemical Technologies (METs) for groundwater bioremediation (electro-bioremediation of nitrate and arsenic) and wastewater treatment (ammonium, nitrate): i) reactor design and operation; ii) microbial electrochemical characterization; iii) scaling-up. Development of natural cleaning processes for sustainable wastewater sanitation and purification using zooplankton.



Dr Hèctor Monclús Sales

Postdoctoral researcher (Juan de la Cierva Incorporación)
hector.monclus@lequia.udg.cat
ORCID: 0000-0002-0072-6069

Research topics: Development of environmental decision support systems (EDSS) for drinking water treatment and wastewater treatment. Development of control tools for membrane bioreactors (MBR). Critical tests to evaluate new membranes modules (submerged and side-stream). Development of reliable and sensitive indicators for membrane filtration. Optimization of drinking water treatment plants based on AI tools (artificial neural networks and knowledge based models).

> Predoctoral researchers

January 2019



Tiago Vitor Akaboci

tiago.vitor@lequia.udg.cat
ORCID: 0000-0001-7677-3809

Doctoral thesis: High strength nitrogen wastewater treatment in one-step partial nitrification/anammox process: process automation and minimization of chemical and energy inputs.

Supervisors: Dr Jesús Colprim and Dr Maël Rusalleda.



Ramiro Blasco Gómez

ramiro.blasco@lequia.udg.cat
ORCID: 0000-0002-1762-3656

Doctoral thesis: Unravelling the factors that influence the bio-electrorecycling of carbon dioxide towards biofuels.

Supervisors: Dr Sebastià Puig, Dr Maria Dolors Balaguer and Dr Jesús Colprim.



Lluís Godo Pla

Industrial Doctorate with ATLL
lluis.godo@lequia.udg.cat
ORCID: 0000-0001-6568-654X

Doctoral thesis: Environmental Decision Support Systems (EDSS) applied to drinking water treatment.

Supervisors: Dr Hèctor Monclús (UdG) and Dr Fernando Valero (ATLL).



Miguel Osset Álvarez

miguel.osset@lequia.udg.cat
ORCID: 0000-0001-5292-2275

Doctoral thesis: Water bioremediation by means of bioelectrochemical systems.

Supervisors: Dr Sebastià Puig and Dr Maria Dolors Balaguer.



Sara Johansson

Marie Curie fellow (project TreatRec)
sara.johansson@lequia.udg.cat
ORCID: 0000-0002-0461-4638

Doctoral thesis: Taking advantage of autotrophic nitrogen removal: Potassium and phosphorus recovery from municipal wastewater.

Supervisors: Dr Maël Rusalleda, Dr Jesús Colprim and Dr Bart Saerens (AquaFin).



David Palma Heredia

Industrial doctorate with Consorci Besòs Tordera
david.palma@lequia.udg.cat
ORCID: 0000-0002-9281-6407

Doctoral thesis: Waste valorization in wastewater treatment plants within Consorci Besòs Tordera environment.

Supervisors: Dr Manel Poch and Dr Miquel Àngel Cugueró (Consorci Besòs-Tordera).



Alexandra Popartan

Industrial doctorate with CETAQUA
alexandra.popartan@lequia.udg.cat
ORCID: 0000-0002-2308-4062

Doctoral thesis: Integral management of urban water cycle within the circular economy paradigm.

Supervisors: Dr Manel Poch and Dr Maria José Amores (CETAQUA).

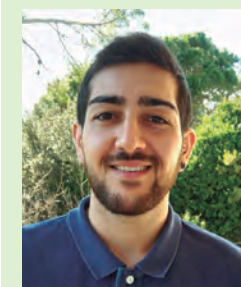


Laura Rovira Alsina

laura.rovira@lequia.udg.cat
ORCID: 0000-0003-2339-843X

Doctoral thesis: Bioelectrochemical systems to thermochemically convert CO₂ into high-value added products.

Supervisors: Dr Sebastià Puig and Dr Maria Dolors Balaguer.



Jordi Suquet Masó

jordi.suquet@lequia.udg.cat
ORCID: 0000-0003-2730-6168

Doctoral thesis: Operation and optimization of drinking water treatment processes.

Supervisors: Dr Hèctor Monclús, Dr Manel Poch and Maria Martín.



Èric Santos Clotas

eric.santos@lequia.udg.cat
ORCID: 0000-0002-2684-6667

Doctoral thesis: Biogas upgrading through adsorption/regeneration processes and membrane bioreactors.

Supervisors: Dr Maria Martín and Dr Joaquim Comas.

> Technical support staff

January 2019



Dr Teresa Bosch Vilardell

teresa.bosch@lequia.udg.cat

Business development and quality manager.



Gemma Rustullet Prat

gemma@lequia.udg.cat

Laboratory technician.



Albert Galizia Amoraga

albert.galizia@lequia.udg.cat

Research technician on membrane technologies.

> Doctoral theses

2014 - 2018



Assessment and optimization of the operation of integrated membrane systems for wastewater reclamation

Author: Julian Mamo. **Supervisor/s:** Dr Joaquim Comas, Dr Ignasi Rodriguez-Roda and Dr Hèctor Monclús. **Defence date:** 11-12-2018. "Cum laude" distinction.



Pharmaceutical and Personal Care Products removal by advanced treatment technologies

Author: Mariem Chtourou Ep Ben Hassen. **Supervisor/s:** Dr. Hector Monclús Sales, Dra. Victòria Salvadó Martín and Dr. Walha Khaled (University of Sfax, Tunisia). **Defence date:** 25-10-2018. "Cum laude" distinction.

<http://hdl.handle.net/10803/664966>



Assessment of struvite and K-struvite recovery from digested manure

Author: Elena Tarragó Abella. **Supervisor/s:** Dr Maria Dolors Balaguer, Dr Sebastià Puig and Dr Maèl Rusalleda. **Defence date:** 13-2-2018. "Cum laude" distinction.

<http://hdl.handle.net/10803/663399>



Integrating computational fluid dynamics and biological models to assess wastewater reactor design

Author: Albert Vilà Rovira. **Supervisor/s:** Dr Jesús Colprim, Dr Maria Dolors Balaguer and Dr Maèl Rusalleda. **Defence date:** 20-10-2017. "Cum laude" distinction.

<http://hdl.handle.net/10803/461774>



Carbon and nitrogen treatment in industrial wastewaters using bioelectrochemical systems

Author: Anna Vilajeliu Pons. **Supervisor/s:** Drs Sebastià Puig, Maria Dolors Balaguer and Jesús Colprim. **Defence date:** 26-5-2017. UdG PhD Extraordinary award. "Cum laude" distinction.

<http://hdl.handle.net/10803/406094>



Decision support systems for the selection on sanitation systems

Author: Alba Castillo Llorens. **Supervisor/s:** Dr Manel Poch. **Defence date:** 17-3-2017.

<http://hdl.handle.net/10803/402947>



Decision-support for adaptive and sustainable urban wastewater system management in the face of uncertainty

Author: Antonia Hadjimichael. **Supervisor/s:** Dr Joaquim Comas and Dr Lluís Corominas (ICRA). **Defence date:** 14-12-2016. "Cum laude" distinction.

<http://hdl.handle.net/10803/482080>



Bioelectrochemical transformation of carbon dioxide to target compounds through microbial electrosynthesis

Author: Pau Batlle Vilanova. **Supervisor/s:** Dr Sebastià Puig, Dr Rafael González (IQS-URL) and Dr Jesús Colprim. **Defence date:** 20-10-2017. UdG PhD Extraordinary award. PTECO2 Awards for 'The best doctoral thesis on Capture, Transportation, Storage and Uses of CO2 Technologies'. "Cum laude" distinction.

<http://hdl.handle.net/10803/399148>



Siloxane removal in the energy recovery of biogas: Sequential adsorption/oxidation processes

Author: Alba Cabrera Codony. **Supervisor/s:** Dra. Maria Martín and Dr. Rafael González (IQS-URL). **Defence date:** 27-7-2016. "Cum laude" distinction.

<http://hdl.handle.net/10803/399731>



Insights into key parameters for bio-alcohol production in syngas fermentation using model carboxydotrophic bacteria

Author: Sara Ramió Pujol. **Supervisor/s:** Dr. Jesús Colprim, Dr. Lluís Bañeras (GEMM-UdG) and Dr. Ramon Ganigué (UGhent). **Defence date:** 7-6-2017. "Cum laude" distinction.

<http://hdl.handle.net/10803/388041>



Comprehensive inventories for Life Cycle Assessment in urban wastewater systems

Author: Sadurní Morera Carbonell. **Supervisor/s:** Dr Joaquim Comas, Dr Lluís Corominas (ICRA) and Dr Miquel Rigola. **Defence date:** 19-2-2016. "Cum laude" distinction.

<http://hdl.handle.net/10803/363226>



Towards better management of combined sewer systems – a methodology based on low-cost monitoring

Author: Albert Montserrat Royuela. **Supervisor/s:** Dr Lluís Corominas (ICRA) and Dr Manel Poch. **Defence date:** 03/07/2015. "Cum laude" distinction.

<http://hdl.handle.net/10803/387560>



From inocula to biological reactors: molecular characterization of N-cycle bacterial assemblages in a PANAMMOX® process

Author: Alexandre Sánchez Melsió. **Supervisor/s:** Dr Jesús Colprim and Dr Xavier Vila (geMM-UdG).
Defence date: 05/06/2015. "Cum laude" distinction.

<http://hdl.handle.net/10803/383761>



Bioremediation of nitrate-polluted groundwater using bioelectrochemical systems

Author: Narcís Pous Rodríguez. **Supervisor/s:** Dr Sebastià Puig Broch, Dr Maria Dolors Balaguer Condom and Dr Jesús Colprim Galceran. **Defence date:** 28-05-2015. UdG PhD Extraordinary award. "Cum laude" distinction.

<http://hdl.handle.net/10803/302539>



Integrated operation of membrane bioreactors: simulation and experimental studies

Author: Montserrat Dalmau Figueras. **Supervisor/s:** Dr Joaquim Comas, Dr Ignasi Rodriguez-Roda and Dr Eduardo Ayesa (CEIT). **Defence date:** 17-10-2014. "Cum laude" distinction.

<http://hdl.handle.net/10803/284740>



Minimisation and abatement of volatile sulphur compounds on sewage sludge processing

Author: Esther Vega Martínez. **Supervisor/s:** Dr Maria Martín and Dr Rafael González.
Defence date: 30-07-2014. "Cum laude" distinction.

<http://hdl.handle.net/10803/283655>



Effects of operational conditions on the performance of a partial nitrification SBR treating high nitrogen loads

Author: Jordi Gabarró Bartual. **Supervisor/s:** Dr Jesús Colprim, Dr Marilós Balaguer and Dr Maèl Rusalleda. **Defence date:** 18-07-2014. "Cum laude" distinction.

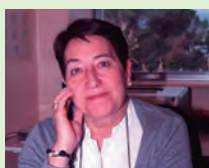
<http://hdl.handle.net/10803/283970>



Diagnosis, assessment and optimisation of the design and operation of municipal MBRs

Author: Sara Gabarrón Fernández. **Supervisor/s:** Dr Joaquim Comas and Dr Ignasi Rodriguez-Roda.
Defence date: 16-05-2014. "Cum laude" distinction.

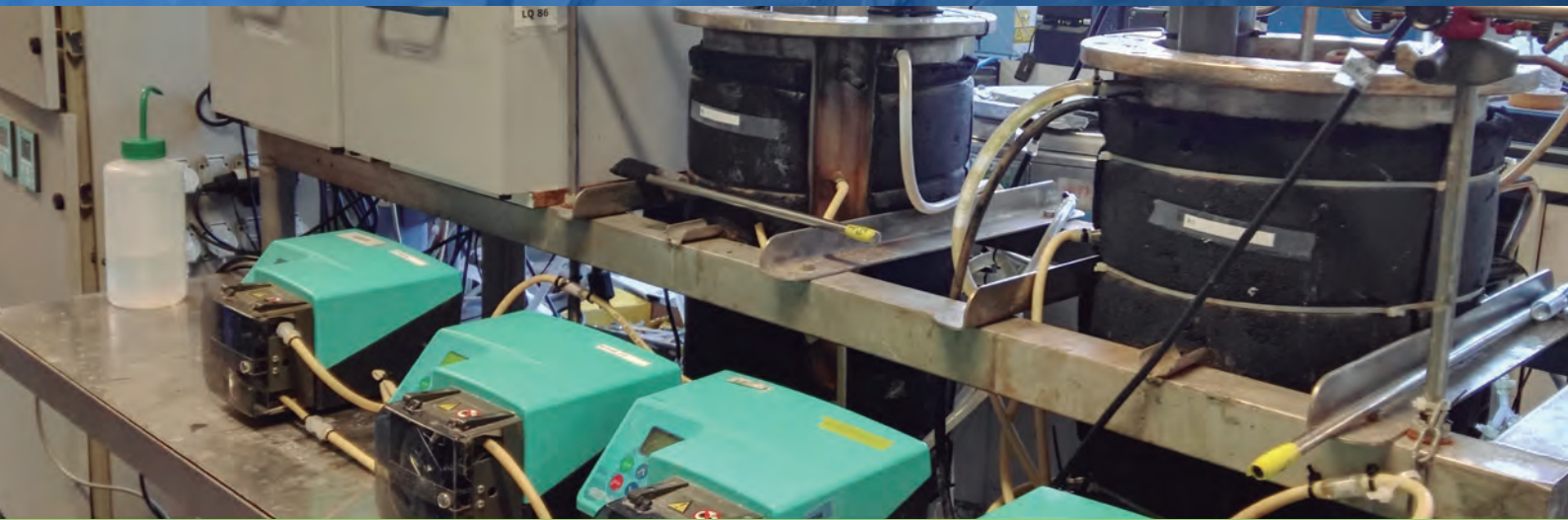
<http://hdl.handle.net/10803/145434>



Implementació d'eines avançades de control per a l'eliminació de nitrogen i optimització dels costos energètics a l'EDAR de la Vall del Ges

Author: Neus Pellicer Johera. **Supervisor/s:** Prof Manel Poch and Dr Fèlix Carrasco (EQATA-UdG).
Defence date: 31-03-2014.

<http://hdl.handle.net/10803/133154>



PUBLICATIONS



Partial nitrification and anammox process for nitrogen removal

SELECTED PUBLICATIONS

> Microbial electrotechnologies for water remediation

- > Vilajeliu-Pons, A., Koch, C., Balaguer, M.D., Colprim, J., Harnisch, F., Puig, S. **Microbial electricity driven anoxic ammonium removal** (2018) *Water Research*, 130, pp. 168-175
- > Sevda, S., Sreekishnan, T.R., Pous, N., Puig, S., Pant, D., **Bioelectroremediation of perchlorate and nitrate contaminated water: A review** (2018) *Bioresource Technology*, 255, pp. 331-339.
- > Battle-Vilanova, P., Ganigué, R., Ramió-Pujol, S., Bañeras, L., Jiménez, G., Hidalgo, M., Balaguer, M.D., Colprim, J., Puig, S. **Microbial electrosynthesis of butyrate from carbon dioxide: Production and extraction**, (2017) *Bioelectrochemistry*, 117, pp. 57-64.
- > Pous, N., Puig, S., Balaguer, M.D., Colprim, J., **Effect of hydraulic retention time and substrate availability in denitrifying bioelectrochemical systems**, (2017) *Environmental Science: Water Research and Technology*, 3 (5), pp. 922-929
- > Vilajeliu-Pons, A., Puig, S., Salcedo-Dávila, I., Balaguer, M.D., Colprim, J., **Long-term assessment of six-stacked scaled-up MFCs treating swine manure with different electrode materials**, (2017) *Environmental Science: Water Research and Technology*, 3 (5), pp. 947-959.
- > Hassan, M., Pous, N., Xie, B., Colprim, J., Balaguer, M.D., Puig, S., **Employing Microbial Electrochemical Technology-driven electro-Fenton oxidation for the removal of recalcitrant organics from sanitary landfill leachate**, (2017) *Bioresource Technology*, 243, pp. 949-956.
- > Hassan, M., Pous, N., Xie, B., Colprim, J., Balaguer, M.D., Puig, S., **Influence of iron species on integrated microbial fuel cell and electro-Fenton process treating landfill leachate** (2017) *Chemical Engineering Journal*, 328, pp. 57-65.
- > Borea, L., Puig, S., Monclús, H., Naddeo, V., Colprim, J., Belgiorno, V., **Microbial fuel cell technology as a downstream process of a membrane bioreactor for sludge reduction**, (2017) *Chemical Engineering Journal*, 326, pp. 222-230.
- > Pous, N., Carmona-Martínez, A.A., Vilajeliu-Pons, A., Fiset, E., Bañeras, L., Trably, E., Balaguer, M.D., Colprim, J., Bernet, N., Puig, S., **Bidirectional microbial electron transfer: Switching an acetate oxidizing biofilm to nitrate reducing conditions** (2016), *Biosensors and Bioelectronics*, 75, 352-358, 6.
- > Vilajeliu-Pons, A., Puig, S., Pous, N., Salcedo-Dávila, I., Bañeras, L., Balaguer, M.D., Colprim, J., **Microbiome characterization of MFCs used for the treatment of swine manure**, 2015, *Journal of Hazardous Materials*, 288, 60-68.



Microbial electrosynthesis of ethanol in tubular reactors

- > Pous, N., Puig, S., Dolors Balaguer, M., Colprim, J., **Cathode potential and anode electron donor evaluation for a suitable treatment of nitrate-contaminated groundwater in bioelectrochemical systems**, 2015, *Chemical Engineering Journal*, 263, 151-159.
- > Pous, N., Koch, C., Colprim, J., Puig, S., Harnisch, F., **Extracellular electron transfer of biocathodes: Revealing the potentials for nitrate and nitrite reduction of denitrifying microbiomes dominated by Thiobacillus sp.** (2014), *Electrochemistry Communications*, 49, 93, 97,17.
- > Pous, N., Casentini, B., Rossetti, S., Fazi, S., Puig, S., Aulenta, F., **Anaerobic arsenite oxidation with an electrode serving as the sole electron acceptor: A novel approach to the bioremediation of arsenic-polluted groundwater**, 2015, *Journal of Hazardous Materials*, 283, 617-622, 13.

> Microbial electrotechnologies for carbon bioconversion

- > Pepè Sciarria, T., Battle-Vilanova, P., Colombo, B., Scaglia, B., Balaguer, M.D., Colprim, J., Puig, S., Adani, F., **Bio-electrorecycling of carbon dioxide into bioplastics** (2018) *Green Chemistry*, 20 (17), pp. 4058-4066.
- > Vassilev, I., Hernandez, P.A., Battle-Vilanova, P., Freguia, S., Krömer, J.O., Keller, J., Ledezma, P., Viridis, B., **Microbial Electrosynthesis of Isobutyric, Butyric, Caproic Acids, and Corresponding Alcohols from Carbon Dioxide** (2018) *ACS Sustainable Chemistry and Engineering*, 6 (7), pp. 8485-8493.
- > Matemadombo, F., Puig, S., Ganigué, R., Ramírez-García, R., Battle-Vilanova, P., Dolors Balaguer, M., Colprim, J., **Modelling the simultaneous production and separation of acetic acid from CO₂ using an anion exchange membrane microbial electrosynthesis system**, (2017), *Journal of Chemical Technology and Biotechnology*, 92 (6), pp. 1211-1217.
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◀ Membrane bioreactors

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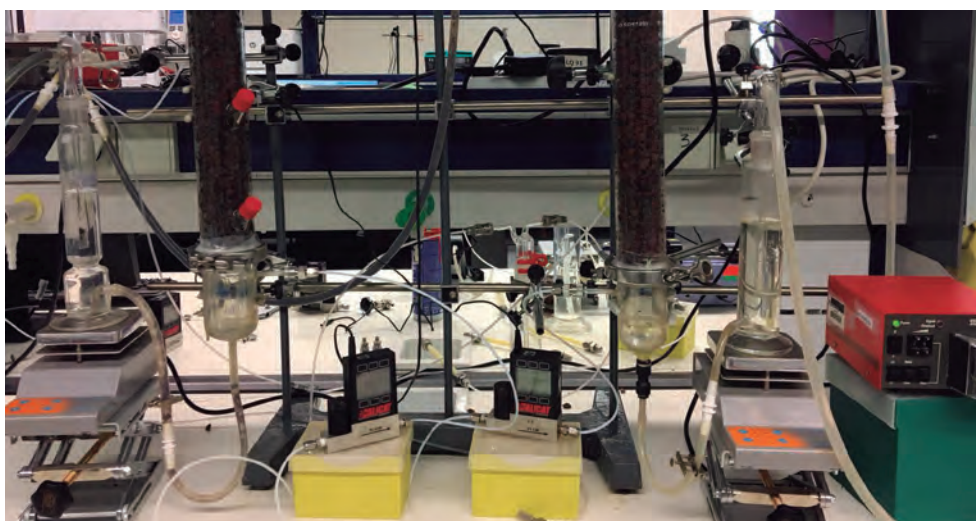
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◀ Biotrickling filter for biogas upgrading

> Advanced adsorption and oxidation processes

- > Cabrera-Codony, A., Santos-Clotas, E., Ania, C.O., Martín, M.J. **Competitive siloxane adsorption in multicomponent gas streams for biogas upgrading** (2018) *Chemical Engineering Journal*, 344, pp. 565-573.
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CONFERENCES

2014 - 2018

SCIENTIFIC WORKSHOPS AND CONFERENCES ORGANISED/HOSTED BY US

- > Reunión de la Red Nacional de Tecnologías Electroquímicas Microbianas (IBERIMET), UdG Faculty of Sciences, Girona, 18-19th December 2017.
- > Membranes for water treatment and reuse, 15th June 2017, UdG Scientific and Technological Park, Girona.
- > Circular water management in touristic facilities, 19th June 2017, Hotel Samba, Lloret de Mar, Girona
- > II Foro LEQUIA "Retos y oportunidades de la purificación del biogás", Girona, 15th December 2016.
- > SANITAS Final Conference "Towards a sustainable and integrated urban water management in Europe and beyond: from science to policy", Barcelona, 18th September 2015.
- > SHOWW Technical Workshop New Solutions for wastewater treatment and management, Girona, 7th February 2014.
- > I Foro LEQUIA sobre transferencia tecnológica en el campo del agua, Girona, 12nd December 2014.

SCIENTIFIC EVENTS WE HAVE PARTICIPATED IN

- > Jornadas de Sistemas de Alerta Temprana y Control para prevenir los impactos de las depuradoras, Pamplona, 12-13th December 2018.
- > The 6th IWA Regional Membrane Technology Conference (IWA-RMTC2018), Vadodara, Gujarat, India, 10th - 12th December 2018.
- > Advanced Technologies and Best Practices "Taste the future", Salerno (Italy), 14th-17th November 2018.
- > iWATER, Barcelona, 13-15 November 2018,
- > Symposium Internacional del Porcino & Feria ganadera, industrial y agroalimentaria SEPORA - Lorca (Murcia). 5-8th November 2018.
- > International Catalysis and Pyrolysis Conference 2018. San Francisco (CA, USA). November 4th-6th.
- > AVS 65th International Symposium & Exhibition. Long Beach, CA (USA), October 21-26th 2018.
- > 2nd International Conference on Bioresource Technology for Bioenergy, Bioproducts & Environmental Sustainability, Sitges (Barcelona, Spain), 16 - 19 September, 2018.
- > 11th International Conference on Urban Drainage Modelling, Palermo (Italy), 23-26 September 2018.
- > 5th International Conference on Small and Decentralized Water and Wastewater Treatment Plants - Thessaloniki, August 26-29, 2018.
- > Political Ecology Network, Biennial Conference 2018. Oslo (Norway), 19-22nd June 2018.
- > 18th European Congress on Biotechnology, Geneva, Switzerland, 1 - 4 July, 2018.
- > Carbon 2018. The World Conference on Carbon - Madrid, Spain, July 1-6th 2018.
- > Euromembrane - Valencia, 9th - 13th July 2018.
- > Reunión 2018 de la Mesa Española de Tratamiento de Aguas (META2018). Universidad de León, 18-19th June 2018.

> 9th International Congress on Environmental Modelling & Software (iEMS2018) – Colorado State University, USA, June 24-28th 2018.

> IWA Conference - Sludge Management in Circular Economy (SMICE 2018), Rome (Italy). 23-25th May 2018

> Seminario Red Novedar “Hacia un balance positivo de energía en depuradoras”, Madrid, 3rd April 2018.

> Granular Sludge Conference, Delft, the Netherlands, 18 - 21 March 2018.

> Odors and Air Pollutants Conference, Portland (Oregon, USA), March 25, 2018.

> 6th IWA/WEF Water Resource Recovery Modelling Seminar 2018 – Lac Beauport - Québec (Canada). March 10-14th 2018.

> Congrés Català de l’Aigua, Barcelona, 22-23rd March 2017

> 3rd International Conference on Desalination using Membrane Technology, Gran Canaria, Spain, 2-5th April 2017

> Aportando valor al CO2, Tarragona 9-10th May 2017.

> Frontiers International Conference on Wastewater Treatment. 21-24 May 2017 – Palermo, Italy

> XXXVI Reunión BIENAL de la Real Sociedad Española de QUÍMICA, Sitges (Barcelona), 28th June 2017

> 6th International Symposium on Biosorption and Biodegradation, Prague (Czech Republic), June 25-27th 2017

> 7th Congress of European Microbiologists – July 9-13, Valencia

> 7th International Conference on Biotechniques for Air Pollution, Control and Bioenergy (Biotechniques-2017), La Coruña, 19th -21st July

> 10th World Congress of Chemical Engineering, 1-5th October 2017, Barcelona

> 6th General Meeting of the International Society for Microbial Electrochemistry and Technology (ISMET 6), Lisbon (Portugal), 3-6th October 2017

> 13th Conference of the European Sociological Association held in Athens (Greece) on 29th August-1st September 2017

> 1a Jornada Técnica en Tratamiento de Aguas: Aplicaciones de las Tecnologías de Membranas en el Ciclo Integral del Agua. Universitat Jaume I, Castelló de la Plana (Spain), 14-15th December 2017.

> “What do we know about the fate of micropollutants in STPs?”, Santiago de Compostela, 23rd February 2016.

> Eco-Bio2016 conference (Challenges in building a sustainable biobased economy), Rotterdam (The Netherlands), 6-9th March 2016.

> “Up-scaling Bioelectrochemical Systems towards application”, Wetsus (The Netherlands), March 10th 2016.

> WWTMod2016, 5th IWA/WEF Wastewater Treatment Modelling Seminar 2016, Annecy (France), 2-6th April 2016.

> The 13th IWA Leading Edge Conference on Water and Wastewater Technologies, Jerez de la Frontera, 13-16th June 2016.

> META2016 - XII Reunión de la Mesa Española de Tratamiento de Aguas, Madrid, 20-22nd June 2016.

> 1º Jornada Técnica en Depuración de Aguas Residuales: Digestión Anaerobia, Castelló de la Plana, 7-8th July 2016.

> Carbon 2016 – The world conference on carbon - Pennsylvania (USA), 10-15th July 2016.

- > 8th International Congress on Environmental Modelling & Software (iEMS2016), Toulouse (France), July 10 - 14, 2016.
- > EcoSummit 2016, "Ecological Sustainability: Engineering Change", Montpellier (France), 28th August – 1st September 2016.
- > 1st International Conference on Sustainable Water Processing, Sitges (Barcelona), 11-14th September 2016.
- > 13th IWA Specialized Conference on Small Water and Wastewater Systems & 5th IWA Specialized Conference on Resources-Oriented Sanitation, Athens (Greece), 14-16th September 2016.
- > The 3rd European Meeting of the International Society for Microbial Electrochemistry and Technology, Rome (Italy), 26th September 2016.
- > Leading Edge Wastewater Treatment, Jönköping (Sweden), 27th September 2016.
- > Jornada final del proyecto LIFE OFREA, San Pedro del Pinatar (Murcia), 27th September 2016.
- > 1st International Conference on Bioresource Technology for Bioenergy, Bioproducts & Environmental Sustainability, Sitges (Barcelona), 23-26 October 2016.
- > Seminario "Tecnologías Innovadoras para el Tratamiento de Aguas Residuales, Lodos de Depuradora y Residuos", red NOVEDAR, Madrid, 3th November 2016.
- > International forward osmosis summit, Sydney (Australia), 2-4th Dec 2016.
- > International membrane science and technology conference, Adelaide (Australia), 5-8th Dec 2016.
- > 21st International Conference on Advanced Oxidation Technologies for Treatment of Water, Air and Soil (AOTs-21), San Diego (California, USA), 16th-19th November 2015.
- > 14th World Congress on Anaerobic Digestion in Viña del Mar (Chile), 15-18th November 2015.
- > II Jornada Tècnica – Recerca, desenvolupament i innovació en l'aigua de consum humà, Barcelona, 3rd November 2015.
- > 5th International Meeting on Microbial Electrochemistry and Technologies (ISMET2015), Arizona State University (USA), 1-4th October 2015.
- > 1st IWA Resource Recovery Conference" (RR2015), Ghent (Belgium), 30th August – 2nd September 2015.
- > Summer meeting on Bio-electrochemistry (SMOBE-2015), U. Antwerpen (Belgium), 17-20 August 2015.
- > Carbon 2015 – The world conference on carbon, Dresden (Germany), July 12-17th 2015.
- > The 9th Symposium on Systems Analysis and Integrated Assessment, Watermatex 2015, Gold Coast, Queensland (Australia), 14-17th June 2015.
- > The 12th IWA Leading Edge Conference on Water and Wastewater Technologies (LET2015), Hong Kong (China), 30th May – 3rd June 2015.
- > 11th International Conference on Renewable Resources and Biorefineries, York (UK), 3-5th June 2015.
- > V Jornada sobre Bioreactores de Membrana, Barcelona, 28th May 2015.
- > Euromed2015 – Desalination for Clean Water and Energy- Palermo (Italy), 10-14th May 2015.
- > Environmental Technology for Impact (ETEI2015) – Wageningen (The Netherlands), 29-30th April 2015.
- > Bacterial Electron Transfer Processes and their Regulation Meeting, Vimeiro (Portugal), 15-18th March 2015.



◀ Workshop "Membranes for water treatment and reuse", 15th June 2017, UdG Scientific and Technological Park, Girona

- > 2nd European Sustainable Phosphorus Conference (ESPC2): Taking P to the next level, Berlin, 5-6 March 2015.
- > The second edition of the new developments in IT&Water conference, Rotterdam (The Netherlands), 8-10th February 2015.
- > 6th International Conference on Fundamentals and Development Fuel Cell, Toulouse (France), 3rd-5th February 2015.
- > Reptes Tecnològics del Sector Turístic en el Tractament de l'Aigua, Palamós (Girona), 11th November 2015.
- > "Global Challenges: Sustainable Wastewater Treatment and Resource Recovery", Kathmandu (Nepal), 26 – 30th October 2014.
- > 14th Mediterranean Congress of Chemical Engineering – Expoquimia, Barcelona – 30th September-3rd October 2014.
- > 8th European Waste Water Management Conference & Exhibition – Manchester (UK) – 7-8th October 2014.
- > 2nd European International Society for Microbial Electrochemistry and Technology Meeting (EU-ISMET), Alcalá de Henares (Madrid), 3-5th September 2014.
- > IV International Conference on Industrial and Hazardous Waste Management "CRETE 2014", Chania (Crete, Greece), September 2nd – 5th 2014.
- > 2nd IWA Specialized International Conference "Ecotechnologies for Wastewater Treatment (EcoSTP2014)", Verona (Italy), June 23-25th 2014.
- > XI Reunión de la Mesa Española de Tratamiento de Aguas – Alicante. 18-20th June 2014
- > IWA conference, 'Activated Sludge - 100 Years and Counting', Essen (Germany), June 12 - 14, 2014
- > 4th European Conference on Sludge Management, Ismir (Turkey), 26-27 May 2014
- > Application of Bio-Electrochemical Systems in Effluents", ValueFromUrine EU project, Sevilla, 14th February 2014.

PROJECTS

> European projects



ELECTRA - Electricity driven Low Energy and Chemical input Technology for Accelerated bioremediation

Program and call: H2020-NMBP-TR-IND-2018-2020 / **Duration:** January 2019-December 2023 / **PI:** Dr Sebastià Puig / **Role:** partner / **Reference:** GA 826244

<http://electra.site>

WAFRA

WAFRA – Wireless Aquaponic Farming in Remote Areas: A smart adaptive socio-economic solution

Program and call: ERANET MED 2017 / **Duration:** November 2018-October 2020 / **PI:** Dr Sebastià Puig / **Role:** partner / **Reference:** PCI2018-092946



EdiCitNet - Edible Cities Network - Integrating Edible City Solutions for social resilient and sustainably productive cities

Program and call: H2020-SCC-NBS-2017 / **Duration:** September 2018 - August 2023 / **Role:** partner / **Reference:** GA 776665

BioRECOVER

BioRECO2VER - Biological routes for CO2 conversion into chemical building blocks

Program and call: H2020-NMBP-BIO-2017 / **Duration:** January 2018 – December 2021 / **PI:** Dr Sebastià Puig / **Role:** partner / **Reference:** GA 760431

<http://bioreco2ver.eu/>



INNOQUA - Innovative Ecological on-site Sanitation System for Water and Resource Savings

Program and call: H2020-WATER-2014-2015 / **Duration:** June 2016 - May 2020 / **PI:** Dr Victòria Salvadó / **Role:** partner / **Reference:** GA 68981.

<http://innoqua-project.eu>



TreatREC - Interdisciplinary concepts for municipal wastewater treatment and resource recovery. Tackling future challenges

Program and call: H2020 - MSCA - ITN - 2014 (EID) / **Duration:** January 2015-December 2018 / **PI:** Dr Joaquim Comas / **Role:** partner / **Reference:** GA 642904

<http://treatrec.eu>



ManureEcoMine - Green fertilizer upcycling from manure: Technological, economic and environmental sustainability demonstration

Program: FP7-ENV-2013-two stage / **Duration:** November 2013 – October 2016 / **PI:** Dr Jesús Colprim / **Role:** partner / **Reference:** GA 603744

www.manureecomine.eu



SANITAS - Sustainable and integrated urban water system management

Program and call: FP7-MC-ITN / **Duration:** November 2011 – October 2015 / **PI:** Dr Joaquim Comas / **Role:** coordinator / **Reference:** GA 289193

www.sanitas-itn.eu



Watintech - Smart decentralized water management through a dynamic integration of technologies

Program and call: Water JPI – WaterWorks 2014 / **Duration:** April 2016 – March 2019 / **Role (ICRA):** coordinator / **Reference:** PCIN-2015-257.

<http://watintech.eu>



DemEauMed - Demonstrating integrated innovative technologies for an optimal and safe closed water cycle in Mediterranean tourist facilities

Program and call: FP7-ENV-2013-Water-Inno-Demo / **Duration:** November 2013 – May 2017 / **PI:** Dr Ignasi Rodriguez-Roda / **Role (ICRA):** partner / **Reference:** GA 699116.

<http://demeaumed.eu>



R3Water - Demonstration of innovative water solutions for reuse of water, recovery of valuable substances and resource efficiency in urban wastewater treatment

Program and call: FP7-ENV-2013-Water-Inno-Demo / **Duration:** November 2013 – May 2017 / **PI:** Dr Ignasi Rodriguez-Roda / **Role (ICRA):** partner / **Reference:** GA 619093

<http://r3water.eu>

> National projects without business participation



WATSON - Toward the development of an EDSS for water treatment works: from basic research to optimal operation at full-scale

Funding entity: Spanish Ministry of Science / **Program:** Proyectos I+D+I “Retos de Investigación” / **Duration:** January 2018 – December 2020 / **PI:** Dr Maria Martín / **Role:** sole beneficiary / **Reference:** CTM2017-83598-R



Circular Economy to ease urban water reuse in a touristic city: centralised or decentralised management?

Funding entity: Spanish Ministry of Science / **Program:** Proyectos I+D+I “Retos de Investigación” / **Duration:** January 2018 – December 2020 / **PI:** Dr Joaquim Comas / **Role (ICRA):** sole beneficiary / **Reference:** CTM2017-85385-C2-1-R

BIOGASAPP

BiogasApp - Innovative technologies for biogas upgrading: from basic research to technology assessment

Funding entity: Spanish Ministry of Economy and Competitiveness / **Program:** Proyectos I+D+I "Retos de Investigación" / **Duration:** January 2015 – December 2017 / **PI:** Dr Jesús Colprim and Dr Maria Martín / **Role:** coordinator / **Reference:** CTQ2014-53718-R

BEST-ENERGY

BEST-ENERGY - Bioelectrochemical systems for water treatment: from extracellular electron transfer to biotechnological application

Funding entity: Spanish Ministry of Science and Education / **Program:** Proyectos de investigación fundamental no orientada / **Duration:** January 2012 – December 2014 / **PI:** Dr Jesús Colprim / **Role:** sole beneficiary / **Reference:** CTQ2011-23632

<http://best-energy.blogspot.com>

SiRENA

SiRENA - Removal of siloxanes in the energy recovery of WWTP biogas: Advanced oxidation process

Funding entity: Spanish Ministry of Science and Education / **Program:** Proyectos de investigación fundamental no orientada / **Duration:** January 2012 – December 2014 / **PI:** Dr Maria Martín / **Role:** sole beneficiary / **Reference:** CTQ2011-24114.

WATER-FATE

WATER-FATE - The fate of micropollutants and disinfection by-products in integrated membrane systems followed by disinfection. The potential of indirect and direct potable reuse

Funding entity: Spanish Ministry of Economy and Competitiveness / **Program:** Proyectos de investigación fundamental no orientada / **Duration:** January 2012 – December 2014 / **PI:** Dr Ignasi Rodriguez-Roda / **Role (ICRA):** sole beneficiary / **Reference:** CTM2012-38314-C0201

> National projects with business participation



DigesTake – Recovery and valorisation of resources from urban digestates within the framework of circular economy

Funding entity: ACCIÓ / **Program:** Comunitats RIS3Cat (comunitat Aigua) / **Duration:** July 2017 – December 2020 / **PI:** Dr Jesús Colprim / **Role:** coordinator / **Reference:** COMRDI16-1-0061



Regireu – Research in water reclamation technologies and risk management for water reuse

Funding entity: ACCIÓ / **Program:** Comunitats RIS3Cat (comunitat Aigua) / **Duration:** July 2017 – December 2020 / **PI:** Dr Joaquim Comas / **Role:** coordinator / **Reference:** OMRDI16-1-0062



DrinkIA - Development of a decision support system for drinking water treatment plants to be implemented in the control system of ATLL network distribution centre

Funding entity: ATLL Concessionària de la Generalitat de Catalunya / **Duration:** January 2014 – August 2020 / **PI:** Dr Manel Poch and Dr Hèctor Monclús



Smart Green Gas – Energy valorization of waste and side streams

Funding entity: CDTI / **Program:** CIEN / **Duration:** 2015-2017 / **PI:** Dr Jesús Colprim / **Role:** technology provider contracted by Aqualia / **Contract:** "BECOME – Bioelectrochemical conversion of CO₂ to methane"

NoNit

Nonit – A bioelectrochemical system for nitrate removal from contaminated groundwater

Funding entity: ACCIÓ / **Program:** Nuclis locals / **Duration:** 2014-2016 / **PI:** Dr Jesús Colprim / **Role:** technology provider contracted by Aqua Development Network (ADN).

N-Optimox

N-Optimox – First demonstration plant of the PANAMMOX technology applied to the treatment of leachates

Funding entity: Spanish Ministry of Science and Innovation / **Program:** INNPACTO / **Duration:** 2011-2015 / **PI:** Dr Jesús Colprim / **Role:** partner / **Reference:** IPT-2011-1073-310000.



TECOAGUA – Development of sustainable technologies for integrated water management

Funding entity: CDTI / **Program:** CIEN / **Duration:** 2013-2014 / **PI:** Dr Jesús Colprim / **Role:** technology provider contracted by Abengoa Water / **Contract:** Treatment of industrial effluents with low and high organic matter and nitrogen load by means of Microbial Fuel Cell (MFC) technology.



LIFE SEACAN – Reducing the pressure of fish canneries on the marine environment with novel effluent treatment and ecosystem monitoring

Funding entity: EU DG Environment / **Program:** LIFE / **Duration:** 2016-2017 / **PI:** Dr Jesús Colprim / **Role:** technology provider contracted by CETAQUA Galicia / **Contract:** Study of a reactor for industrial wastewater treatment with aerobic granular technology by means of computational fluid dynamics

www.life-seacan.eu



> Marie Curie postdoctoral fellowships

MEM 2.0

TECNIOspring+
tech transfer
through researchers' mobility

Mem 2.0 - Integration of recycled membranes in water processes

Program: TECNIOspring+ / **Duration:** June 2018 – May 2020 / **PI:** Dr Raquel García (supervisor: Dr Joaquim Comas) / **Reference:** TECSPR17-1-0019

SILCAP

TECNIOspring+
tech transfer
through researchers' mobility

SILCAP - Selective siloxane capture for indoor pco

Program: TECNIOspring+ / **Duration:** December 2017 – November 2019 / **PI:** Dr Alba Cabrera (supervisor: Dr Maria Martín) / **Reference:** TECSPR16-1-0045

SYNTOBU



SYNTOBU – Biological production of butanol from syngas

Program: VIIFP-PEOPLE-2013-CIG / **Duration:** September 2013 – September 2015 / **PI:** Dr Ramon Ganigué (supervisor: Dr Jesús Colprim) / **Reference:** GA 618593

OMBREUSE

TECNIOspring

OMBReuse - Osmotic membrane bioreactor for water reuse

Program: TECNIOspring (FP7-Marie Curie – COFUND, ACCIÓ) / **Duration:** October 2015 – September 2017 / **PI:** Dr Gaëtan Blandin (supervisor: Dr Ignasi Rodriguez-Roda) / **Reference:** TECSPR14-2-0024

SSAMBRA

TECNIOspring

SSAMBRA – Strengthening Smart Air MBR Applications

Program: TECNIOspring (FP7-Marie Curie – COFUND, ACCIÓ) / **Duration:** July 2015 – June 2017 / **PI:** Dr Hèctor Monclús (supervisor: Dr Joaquim Comas) / **Reference:** TECSPR14-2-0021-00

REUCITY

TECNIOspring

REUCITY - Innovative technologies for resource efficient cities

Program: TECNIOspring (FP7-Marie Curie – COFUND, ACCIÓ) / **Duration:** February 2015 – January 2017 / **PI:** Dr Natasa Atanasova (supervisor: Dr Manel Poch) / **Reference:** TECSPR14-1-0013.

> Technology platforms, networks and associations



Comunitat RIS3CatAigua



Action COST Water 2020



EIP Water Action Groupst

RTWQM - Real Time Water Quality Monitoring (AG100); RESEWAM-O
- Remote sensing for water management optimization (AG132).



IBERIMET - National Network of Microbial
Electrochemical Technologie



Red Novedar - Evaluation of innovative technologies for
wastewater treatment



CWP - Catalan Water Partnership



WssTP - The European Water Platform



PTEA - Plataforma Tecnológica Española del Agua



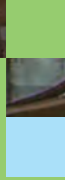
META - Mesa Española de Tratamiento de Aguas



PLANETA - Plataforma de Tecnologías Ambientales



International Water Association (IWA) Specialist Groups



TECHNOLOGY TRANSFER

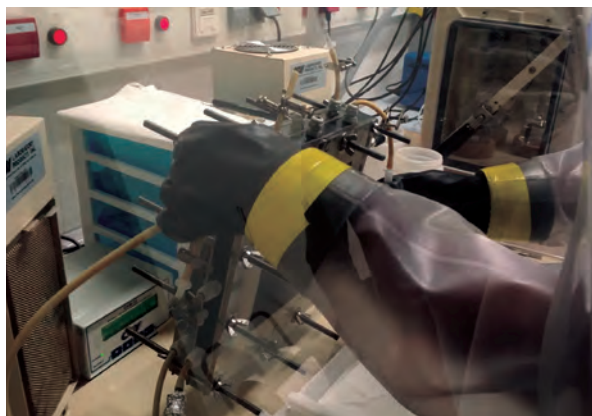
Wastewater treatment plant in Vic, Catalonia, Spain. Winning photo of LEQUIA contest to celebrate World Water Day 2017. Author: Roser Fonseca

Technology transfer to private and public organisations has always been a priority in our group. In addition to the high number of R&D projects with business participation and technology transfer contracts, LEQUIA researchers have obtained several patents and, in 2003, founded the spinoff company Sanejament Intel·ligent S.L. (SISLtech S.L.).

Expertise

Biological nutrient removal and recovery from wastewaters

- > Urban wastewater treatment through carbon, nitrogen and phosphorous removal
- > Treatment of side streams with advanced technologies: anammox, partial nitrification, phosphorous recovery, etc.
- > Panammox® process: nitrification plus anammox process for the treatment of landfill leachates with high ammonia nitrogen content



Microbial Fuel Cells

- > Biminex®: reduction of the excess sludge in extended aeration WWTPs by uncoupling catabolic and anabolic metabolism
- > Biological fermentation of Syngas from excess sludge to obtain biofuels (i.e. ethanol and butanol)

Bioelectrochemical systems (BES)

- > Studies on bioremediation of groundwater polluted with inorganic nitrogen and sulphur compounds.
- > Studies on organic matter and nitrogen removal of urban and industrial (leachate, pig slurry and meat industry effluent) wastewaters.
- > Studies about CO₂ removal/transformation (biogas purification, carbon capture, bioelectrosynthesis of alcohols and volatile fatty acids)
- > Knowledge about the operational parameters to maximize power generation and treatment capacity.
- > Knowledge about BES design and scalability.
- > Identification of microbial population through molecular techniques (FISH, SEM, PCRs).

Advanced adsorption and oxidation processes

- > Analysis of gaseous contaminants.
- > Analysis of odor causing compounds.
- > Adsorption for treating of gaseous and water streams.
- > Competitive adsorption of multicomponent gas streams.
- > Modification of activated carbon to obtain tailored adsorbents.
- > Strategies for odor control.
- > Thermal and oxidative regeneration of exhausted adsorbents.
- > Studies on catalytic materials for heterogeneous reactions.
- > Biogas upgrading: removal of siloxanes and VOCs.


Membrane Bioreactors (MBR)

- > Membrane fouling and clogging: from basic research of the responsible parameters to practical aspects for cleaning and monitoring.
- > Use of MBR for waste gases treatment.
- > Osmotic MBR for wastewater treatment.
- > MBR for grey water treatment and reuse.
- > Integration of MBR and NF or RO (i.e. integrated membrane systems) for advanced water treatment and reuse.
- > Pharmaceuticals and their transformation products in integrated membrane systems for wastewater reclamation.
- > Modelling and simulation of membrane bioreactors at different scales.
- > Monitoring and automatic control of MBRs to optimize biological nutrient removal, while minimizing fouling and saving energy
- > Development and validation of decision support systems for the integrated and knowledge-based supervision of MBRs.

Environmental decision support systems (EDSS)

- > Knowledge management and development and implementation of multi-criteria Environmental Decision Support Systems (EDSS) to support decision making in water-related systems.
- > Integration of Artificial Intelligence (AI) techniques with conventional modelling techniques and control algorithms in EDSS to support the management of complex environmental systems, especially in water (drinking water treatment plants) and wastewater management processes (e.g. membrane bioreactors) and fluvial ecosystems.
- > Planning, design, operation and maintenance of small and decentralized, including natural systems, medium and large wastewater treatment systems.
- > Multi-criteria (technical and socio-economical) and life cycle analysis of urban water systems (UWS).
- > Integrated control of the urban water cycle (sewer system, wastewater treatment plant and receiving media) to improve ecological status of water bodies.
- > Knowledge-based modelling of drinking water treatment systems.
- > Environmental decision support systems applied in Drinking Water Treatment Plants for operation strategies, minimization of influent impacts and evaluation of organic matter fractioning.



Pilot plant for manure treatment 

Patents

- > **Procedimiento automatizado de control en tiempo real de un bioreactor de membranas y un sistema de control correspondiente.** Applicants: University of Girona / OHL Medio Ambiente INIMA S.A.U.; Inventors: Rodríguez-Roda, I.; Poch, M.; Ferrero, G.; Sipma, J.; Clara, P.; Canals, J.; Rovira, S.; Monclús, H.; ES2333837.
- > **Bioelectrochemical Water Treatment and Apparatus.** International Publication Number: WO 2014/082989 A1. Applicant: University of Girona; Inventors: J. Colprim, M.D. Balaguer; S. Puig; N. Pous; PCT/EP2013/074711.
- > **Method for operating a membrane bioreactor of a water treatment system and corresponding membrane bioreactor and water treatment system.** Application number: EP16382307.3. Applicants: University of Girona (85%) and Catalan Institute for Water Research (15%). Inventors: G. Blandin, I. Rodríguez-Roda and J. Comas.

Some of our partners



DISSEMINATION

The dissemination of research activities is part of LEQUIA's mission. Our specific objectives include encouraging primary and high school students to choose degree programmes in sciences, organising activities in the water science field and promoting LEQUIA research activity in Catalan society. Every year, LEQUIA takes part in several dissemination activities, individually or as a research group of the University of Girona.



Winner of LEQUIA photo contest to celebrate World Water Day 2015 on "water and sustainable development". Author: Éric Pairet.

Types of activities:

- > Open house activities
- > Fairs and exhibitions
- > Internships and programs for secondary school students
- > Non-specialised media (press, TV, radio)
- > Workshops and conferences for non-specialised audiences
- > LEQUIA's own dissemination programmes and initiatives

Our main audience:

- > Primary and secondary school students
- > Secondary school teachers
- > Girona and Catalan society

LEQUIA photo contest to celebrate World Water Day

22nd March is World Water Day. From 2014 to 2017 LEQUIA celebrated this date with a Twitter and Instagram photo contest focused on the topic defined by the United Nations: "water and energy" in 2014, "water and sustainable development" in 2015, "water and jobs" in 2016 and "wastewater treatment" in 2017.



Researchers' night 2015 in Girona. LEQUIA workshop on wastewater treatment



FACTS AND FIGURES

Laboratory of research in bioelectrochemical systems 



	2014	2015	2016	2017	2018*	Total
PhD dissertations defended	5	3	5	3	3	19
Peer reviewed scientific publications	28	29	33	35	35	160
Patents filed & granted	1	-	1	1	0	3
Turnover	1.409.528 €	1.626.623 €	1.347.980 €	944.707 €	1.326.072 €	6.654.910 €
Competitive public funds with business participation	736.298 €	729.786 €	802.862 €	483.355 €	671.989 €	3.424.290 €
Competitive public funds without business participation	495.895 €	545.423 €	295.927 €	363.838 €	481.951 €	2.183.034 €
R&D and innovation contracts and services	166.000 €	347.616 €	249.191 €	97.514 €	172.132 €	1.032.453 €

*Data to be validated





CONTACT



Girona Science Park 



Faculty of Sciences – University of Girona 






Laboratory of Chemical and Environmental Engineering

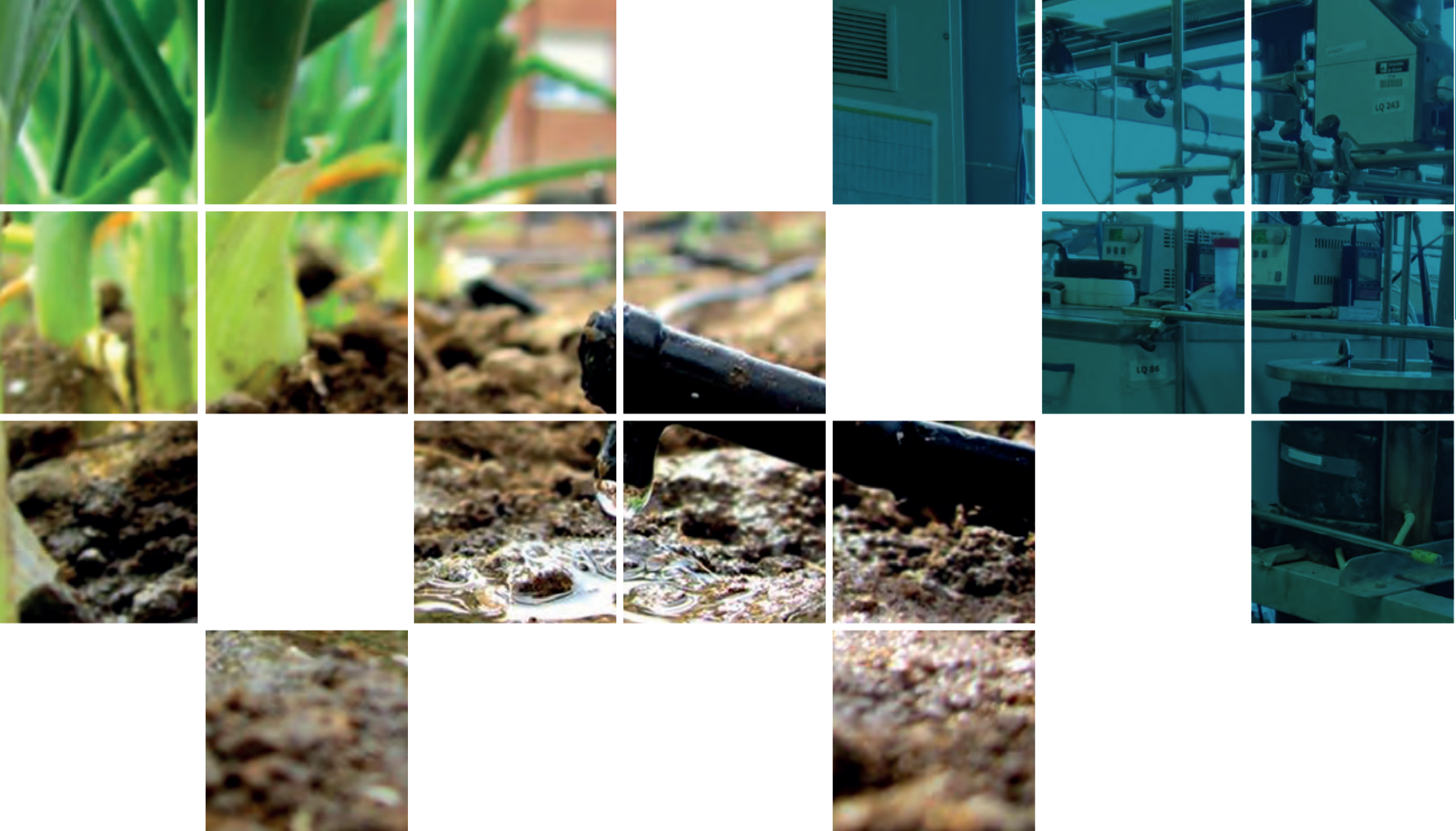
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