

## SCIENTIFIC PORTFOLIO

BioElectrochemical Systems (BES)

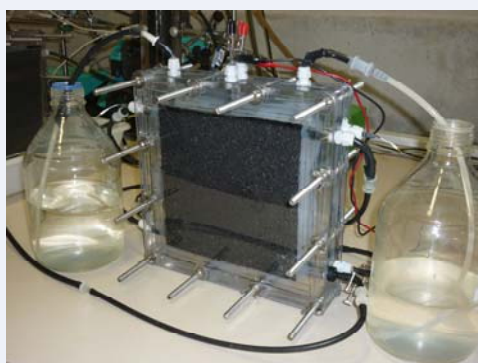
Last updated: December 2016

### Name of scientists in charge

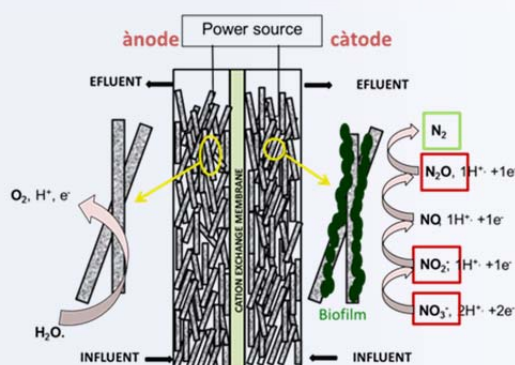
- > **Dr Jesús Colprim**, Associate Professor. [J.Colprim@lequia.udg.cat](mailto:J.Colprim@lequia.udg.cat)
- > **Dr Marilós Balaguer**, Full Professor. [marilos@lequia.udg.cat](mailto:marilos@lequia.udg.cat)
- > **Dr Sebastià Puig**, Assistance Professor. [sebastia@lequia.udg.cat](mailto:sebastia@lequia.udg.cat)

### Technology description

- > Bioremediation of contaminated groundwater.
- > Microbial electrosynthesis: from CO<sub>2</sub> to valuable products.
- > Biogas upgrading to reach high quality biomethane (electromethanogenesis)
- > Organic matter and nitrogen removal from wastewaters.



*Bioelectrochemical system (MFC) at lab scale*



### Research expertise

- > 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 CO<sub>2</sub> removal/transformation (biogas purification, carbon capture)
- > Knowledge about the operational parameters to maximize power generation and treatment capacity.
- > Knowledge about BES design. Scalability.
- > Identification of microbial population through molecular techniques (FISH, SEM, PCRs).

## Most relevant projects

- > **BiogasApp: Innovative technologies for biogas upgrading: from basic research to technology assessment.** Spanish Ministry of Economy and Competitiveness. CTQ2014-53718-R. 2015-2017.
- > **Development of sustainable technologies for the water cycle (TECOAGUA).** Ministry of Economy and Competitiveness. CEN-20091028. Subcontracted by Abengoa Water. 2009-2012.
- > **Bioelectrochemical systems for wastewater treatment: from extracellular transfer to biotechnological application (BEST-ENERGY).** Ministry of Economy and Competitiveness. CTQ2011-23632. 2012-2014.

## Most relevant publications

- > Schievano, A., Pepè Sciarria, T., Vanbroekoven, K., De Wever, H., Puig, S., Andersen, S.J., Rabaey, K. and Pant, D. 2016. **Electro-fermentation – Merging electrochemistry with fermentation in industrial applications.** *Trends in Biotechnology*, Volume 34, Issue 11, p866–878, November 2016.
- > Narcís Pous, Alessandro A. Carmona-Martínez, Anna Vilajeliu-Pons, Erika Fiset, Lluís Bañeras, Eric Trably, M. Dolors Balaguer, Jesús Colprim, Nicolas Bernet, Sebastià Puig (2015), **Bidirectional microbial electron transfer: switching an acetate oxidizing biofilm to nitrate reducing conditions,** *Biosensors and Bioelectronics*, Volume 75, 15 January 2016, Pages 352–358
- > Vilajeliu, S. Puig, N. Pous, I. Salcedo-Dávila, L. Bañeras, M.D. Balaguer, J. Colprim, (2015), **Microbiome characterization of MFCs used for the treatment of swine manure (2015),** *Journal of Hazardous Materials*, 288(15), 60-68.
- > Ganigué, R., Puig, S., Batlle-Vilanova, P., Balaguer, M.D., Colprim, J., **Microbial electrosynthesis of butyrate from carbon dioxide (2014),** *Chem. Commun.*, 2015,51, 3235-323.
- > 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, pp. 93-97.
- > Batlle-Vilanova, P., Puig, S., Gonzalez-Olmos, R., Vilajeliu-Pons, A., Bañeras, L., Balaguer, M.D., Colprim, J. **Assessment of biotic and abiotic graphite cathodes for hydrogen production in microbial electrolysis cells. (2014)** *International Journal of Hydrogen Energy*, 39 (3), pp. 1297-1305.

## Patents

- > **Bioremediation treatment of contaminated water with oxidized nitrogen compounds.** Applicant: Universitat de Girona. Inventors: J. Colprim, M.D. Balaguer, S. Puig, N. Pous. European Patent EP 1238471.6; PCT/EP2013/074711.