

SCIENTIFIC PORTFOLIO

Indoor air pollutants valorization into commodity chemicals and energy vectors

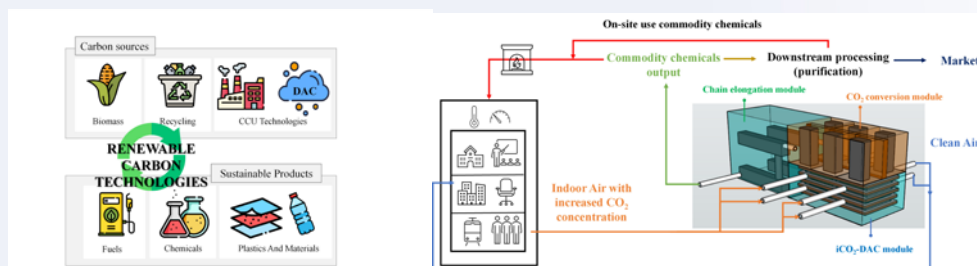
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Name of the scientists in charge

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- > **Dr Maria Dolors Balaguer**, Full Professor. dolors.balaguer@lequia.udg.cat

Technology description

- > Indoor air pollutants capture and concentration
- > Design and optimization of micro(bio)reactors technology for process intensification
- > Application and optimization of materials for indoor air pollutants capture and concentration
- > Microbial electrosynthesis: from CO₂ to valuable products. (*In collaboration with Microbial Electrosynthesis Technologies researchers*)
- > Biogas upgrading (electromethanogenesis). (*In collaboration with Microbial Electrosynthesis Technologies researchers*)



Research expertise

- > Design and development of modules to capture CO₂ from indoor air to produce a concentrated stream to feed bioprocesses such as bioelectrochemical technologies to produce commodity chemicals
- > Design and optimization of high-efficiency mass transfer microreactors for the separation, concentration and biological conversion of indoor air pollutants
- > Design and operation of biological technologies for polluted gaseous streams

Most relevant projects

- > **De-Cent** -Portable bioelectrochemical modules for decentralised mitigation of CO₂ emissions using surplus energy (De-CENT). – Spanish Ministry of Science and innovation. Programme “Proyectos de Transición Ecológica y Transición Digital”. *Work package leader.*
- > **MICRO-BIO** - The MICRO-BIO process: a comprehensive platform to capture CO₂ from indoor air, transform it into valuable carbon-neutral commodity chemicals. H2020-MSCA-IF-2020. GA: 101018274 (CDTI project). 2022-2024. <https://cordis.europa.eu/project/id/101018274>, @MICROBIO_22. *Principal investigator/project leader.*
- > **RITA** - urban water cycle Resilient To pAndemics. AGAUR. Programme PANDÈMIES2020. 2021-2022. *Work package partner*
- > **SiCAP** – Selective Siloxane capture for Photocatalytic Air Purifiers – H2020-MSCA-COFUND-TecnioSpring+TECSPR16-1-0045

Most relevant publications

- > **López, L.R.**, Dessì, P., Cabrera-Codony, A., Rocha-Melogno, L., Kraakman, N.J.R., Naddeo, V., Balaguer, M.D., Puig, S. (2023). **CO₂ in indoor environments: from environmental and health risk to potential renewable carbon source**. Sci. Total Environ. 856 (2), p 159088. doi.org/10.1016/j.scitotenv.2022.159088 (Open Access)
- > Deaton, K., **López, L.R.**, Pascual S., Deshusses, M.A., (2022). **Critical Assessment of Gassing-In Methods to Determine Mass Transfer Coefficient in Miniature and Microbioreactors with Gas-Liquid Flow**. Biochemical Engineering Journal, p 108655. doi.org/10.1016/j.bej.2022.108655
- > **López, L.R.**, Deaton, K., Junkins, J., Deshusses, M.A., (2020). Capillary microbioreactors for VOC vapor treatment: Impacts of operating conditions. Chemosphere, 258, pp 127286. doi.org/10.1016/j.chemosphere.2020.127286
- > **López de León, L.R.**, Deaton, K.E., Deshusses, M.A. (2019). **Miniaturized Biotrickling filters and Capillary Microreactors for Process Intensification of VOC Treatment with Intended Application to Indoor Air**. Environmental Science and Technology. Volume 53, Pages 1518-1526.
- > Myers, T.G., Valverde, A., **Cabrera-Codony, A.** (2023). **On the development of a consistent mathematical model for adsorption in a packed column and why standard models fail**. International Journal of Heat and Mass Transfer

Lab members

- > **Pau Zamora**, bachelor's in biotechnology and Master Student in Water Resources Science and Technology (September 2021-present)
- > **Irene Soler**, Chemistry degree senior student (March 2022- present)
- > **Kieran Jimenez**, Double degree Biotechnology and Biology senior student (July 2022-present)
- > **Joan Bermejo**, Double degree Biotechnology and Biology senior student (September 2022-present)
- > **Ílias Azzouzi**, Double degree Biotechnology and Biology senior student (September 2022-present)