CURRICULUM VITAE (CVA)

CV date	14/09/2023

Part A. PERSONAL INFORMATION

First name	Raquel		
Family name	Lebrero Fernández		
Gender	Female	Birth date	
e-mail	raquel.lebrero@uva.es	http://www.isp.uva.es/	
Open Researcher and Contributor ID (ORCID)		0000-0002-3033-8649	

A.1. Current position

Position	Associate Professor (PTUN)		
Initial date	05/02/2019		
Institution	Universidad de Valladolid (UVa)		
Department/Center	Chemical Engineering and Environmental Technology	Institute of Sustainable Processes (UVa)	
Country	Spain	Telephone number	983183808
Keywords	Biological Gas Treatment, Biogas Upgrading, Environmental Biotechnology, High-mass Transfer Bioreactors, Valorisation of bioplastics, Waste Gas Valorisation		

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
Feb 2015-Feb 2019	PhD Assistant Professor (PAYUD)/ University of Valladolid/Spain/
Feb 2011-Feb 2015	Assistant Professor (AYUD)/University of Valladolid/Spain
July 2009-Feb 2011	PhD student (FPU Grant)/ University of Valladolid/Spain
Aug 2008-July 2009	PhD student (research contract)/University of Valladolid/Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD Degree in Environmental Engineering	University of Valladolid/Spain	2013
Bachelor Degree in Environmental Science	National University of Distance Education/Spain	2015
Master in Process and Systems Engineering	University of Valladolid/Spain	2011
Bachelor Degree in Chemical Engineering	University of Valladolid/Spain	2008

Part B. CV SUMMARY

Raquel Lebrero obtained the double degree in Chemical Engineering at the University of Valladolid (UVa, Spain) and the Imperial College of London (UK) in 2008, being awarded with the Extraordinary Degree Award from UVa and the 3rd Academic Performance National Award. In 2009 she completed the Master in Process and Systems Engineering at UVa, where she also conducted her PhD Thesis on biotechnologies for odour abatement. She got her PhD degree in 2013 with a qualification of Outstanding Cum Laude, receiving the UVa Extraordinary PhD Award. In 2015, she also completed the degree in Environmental Science at the National University of Distance Education. In February 2019, at the age of 33, Raquel Lebrero obtained a position as Associated Professor at the Dpt. of Chemical Engineering and Environmental Technology (UVa), which she holds since then.

During her research career, besides consolidating the experience gained in the field of biological waste gas treatment and valorization (odors, volatile organic compounds and greenhouse gases), she has expanded her research lines by leading and participating in projects focused on biogas upgrading, wastewater treatment and valorization through microalgae technology and indoor air purification. These research lines contribute to the sustainable abatement of detrimental gaseous pollutants, the development of alternative renewable energies, and the advance towards a circular economy model. Her intensive investigation has resulted in 107 research articles published in international indexed journals (~90% Q1). She has also co-authored 15 international and 7 national book chapters and she has an edited book

in the field of gas treatment. Her publications have been cited more than 3470 times (being among the 2% most cited researchers in 2019), with a h index of 32.
Dr. Lebrero has promoted collaborations with leading researchers in the area of biological off-gas treatment and valorization. In this context, Raquel carried out two research stays in leading centers in the area of odour pollution during her PhD: 6-months stay at the Water Research Center (UNSW, Australia) and 5-months stay at EnVOC Group (Ghent University). Within the past 10 years, she has also conducted a 6-months postdoctoral research stay at Sao Paulo University (Brazil) focused on biogas upgrading, a 3-months stay as invited professor at Columbia University (USA) and a 3-months research stay at Federico Santa María University (Chile) with a MEC research grant from the Chilean government. The relationships initiated in these research stays have been maintained over the years, resulting in a number of joint publications and PhD theses.
Her leadership has been demonstrated through the 9 competitive research projects she has led over the past 10 years, with a total budget of more than 2,600,000 €. In particular, she is currently principal investigator of 4 national R&D project and coordinator of the LIFE project ABATE, where the biological processes developed and optimized at laboratory scale are being scaled up and validated in demo sites. The topicality and novelty of her research and the experience gained over the years have also attracted the attention of national and international private companies, with which she has signed a total of 19 R&D contracts with a total budget of over 1,600,000 € in the last 10 years, including specific research activities and consultancy. Additionally, Raquel has co-authored 72 contributions to international conferences, 50 as oral presentations, she has been invited to 3 keynote talks in international conferences, and has been member of the Organizing and Scientific Committee of 3 international conferences. She has also participated as guest lecturer in 16 technical seminars targeted to companies and public administration in the field of biotechnologies for biogas valorization and waste gas treatment, together with informative talks for students and future researchers (i.e. *Research Dissemination Sessions* and the *International Day of Women and Girls in Science* organized by UVa).
In the last decade, Raquel has supervised 3 postdoctoral researchers, 7 PhD Theses (with 14 ongoing), 10 Master Theses, 14 Final Degree Projects and 10 undergraduate research projects. It is worth noting that all her graduates hold research-related jobs, and Dr. J.M. Estrada recently created a company specialized in biotechnologies for environmental applications (http://trovanttech.com/). In addition to the above, in this period Raquel has been member of the scientific committee of 18 international conferences, project evaluator of the Spanish and other international research agencies, project evaluator for the European Commission, member of the PhD evaluation committee of 4 international theses and is regular reviewer in more than 25 JCR journals. Thanks to all these achievements, Raquel was awarded in 2019 the Medal "Juan López de Peñalver" for young researchers by the Spanish Royal Academy of Engineering.

Part C. RELEVANT MERITS
C.1. Publications

- Cantera S., López M., Muñoz R., **Lebrero R**. (2023) Comparative evaluation of bacterial and fungal removal of indoor and industrial polluted air using suspended and packed bed bioreactors. Chemosphere 308, 136412.
- Pascual C., Cantera S., Muñoz R., **Lebrero R**. (2022) Innovative polishing stage in biogas upgrading: Siloxanes abatement in an anoxic two-phase partitioning biotrickling filter. Journal of Cleaner Production.
- Severi C., Pérez V., Pascual C., Muñoz R., **Lebrero R.** (2022) Application of a fuzzy multi-attribute HAZOP and a fuzzy TOPSIS model to a pilot biogas upgrading plant Chemosphere 307, 135845.
- Pascual C., Cantera S., **Lebrero R.** (2021) Volatile Siloxanes Emissions: Impact and Sustainable Abatement Perspectives. Trends in Biotechnology 39(12): 1245-1248.
- Ángeles R., Arnaiz R., Gutiérrez J., Muñoz R., **Lebrero R.** (2021). Biogas-based production of glycogen by *Nostoc muscorum*: Assessing the potential of transforming CO_2 into value added products. Chemosphere, 275, 129885.
- Pascual C., Cantera S., Muñoz R., **Lebrero R.** (2021). Siloxanes removal in a two-phase partitioning biotrickling filter: Influence of the EBRT and the organic phase. Renewable Energy 177: 52-60.
- Ángeles R., Arnaiz E., Gutiérrez J., Sepúlveda-Muñoz C.A., Fernández-Ramos O., Muñoz R., **Lebrero R.** (2020) Optimization of photosynthetic biogas upgrading in closed photobioreactors combined with algal biomass production. Journal of Water Process Engineering 38: 101554.
- Pérez V., Mota C., Muñoz R., **Lebrero R.** (2020) Polyhydroxyalkanoates (PHA) production from biogas in waste treatment facilities: Assessing the potential impacts on economy, environment and society. Chemosphere, 255, 126929.

▪Carvajal A., Akmirza I., Navia D., Pérez R., Muñoz R., **Lebrero R.** (2018) Anoxic denitrification of BTEX: Biodegradation kinetics and pollutant interactions. Journal of Environmental Management 214(15): 125-136.
▪Akmirza I., Pascual C., Carvajal A., Pérez R., Muñoz R., **Lebrero R.** (2017) Anoxic biodegradation of BTEX in a biotrickling filter. Science of the Total Environment 587-588: 457-465.

C.2. Congress

▪ Casado S., Muñoz R., **Lebrero R.** Enrichment of mesophilic syngas-converting consortia for methane production. *18th International Conference on Environmental Science and Technology.* 30 August-02 September 2023, Greece. (Oral presentation)
▪ **Lebrero R.,** Cantera S., Rodríguez S., Pérez R. Toluene valorization into PHA by Rhodococcus opacus. *6th International Conference on eco-Technologies for Wastewater Treatment EcoSTP 2023*. 26-29 June 2023. Spain (Poster presentation)
▪ **Lebrero R.** From VOC to valuable products. *Microbial Cycling of Volatile Organic Compounds.* 7-8 February 2022. Norwich, UK. (Invited keynote)
▪ **Lebrero R.** Algae/bacteria treatment for biogas upgrading. *5th International Conference on Ecotechnologies for Wastewater Treatment, IWA EcoSTP 2021*. 21-25 June 2021, Italy (Invited speaker).
▪ Muñoz R., González-Martín J., **Lebrero R.** Latex –based biofilms for indoor air purification. 9th IWA Conference on Odours & VOCs/Air Emissions. 26-27 October 2021. Spain (Oral Presentation).
▪ **Lebrero R.** Biogas from anaerobic digestion: future prospects for sustainable use and valorization. *WaterEnergyNEXUS Conference* (3rd WEN), 3-4 December 2020. Online. (Keynote)
▪ Ángeles R., Gutiérrez J., Arnaiz E., Muñoz R., **Lebrero R.** Evaluation and optimization of photosynthetic biogas upgrading in a tubular photobioreactor. *IWA Conference on Algal Technologies and Stabilization Ponds for Wastewater Treatment and Resource Recovery*. 1-2 February 2019. Spain (Oral Presentation)
▪ Pascual C., Arnáiz E., Muñoz R., **Lebrero R.** Biological removal of siloxanes from biogas for biomethane injection in natural gas grid. Anaerobic Digestion Conference AD16. 23-27 June 2019. The Netherlands (Oral Presentation)
▪ Ángeles R., Oliva G., Zarra T., Naddeo T., Belgiorno V., Muñoz R., **Lebrero R.** Comparative Evaluation of a Biotrickling Filter and a Tubular Photobioreactor for the continuous abatement of Toluene. *6th International Conference on Environmental Odour Monitoring & Control*. 9-12 September 2018. Italy (Oral Presentation)
▪ Akmirza I., Carvajal A., Muñoz R., **Lebrero R.** Interactions between BTEX compounds during their anoxic degradation. *5th International Conference on Environmental Odour Monitoring & Control*. 28-30 September 2016. Italy (Oral Presentation).

C.3. Research projects *(as principal investigator)*

▪*Marketable high performance compact technologies for the abatement of VOCs in EU wastewater treatment plants, decreasing CO_2 emissions and energy consumption (LIFE ABATE).* LIFE-2022-SAP-ENV. 403,359.61 € (University of Valladolid)/ 1,947,637.32 € (Total budget). (2023-2027) P.I.: **R. Lebrero** (PI from University of Valladolid and project coordinator).

▪ *Upscaling of Taylor flow reactors for the Valorization of industrial off-Gas emissions (UpVaLGas) (PDC2022-133394-I00).* Proyectos de «Prueba de Concepto» 2022. 149,500 €. (2023-2024). P.I.: R. Muñoz, **R. Lebrero**

▪ *From residual volatile organic compounds to valuable products: novel strategies to valorize waste gaseous emissions (ReCOVery) (TED2021-129340B-I00).* Proyectos de Transición Ecológica y Digital 2021. 172,500 € (11/2022 – 10/2024). P.I.: **R. Lebrero**

▪*Advanced bioprocesses for the bioconversion of syngas from waste gasification into biomethane, organic acids and alcohols (SYNBIOCONV).* Convocatoria: Proyectos de Generación de Conocimiento 2021 (PID2021-124347OB-I00). 290,400.7 €. (01/2022 - 12/2025). P.I.: **R. Lebrero,** R. Muñoz,

▪*Biomass and waste as a precursor for the couple production of hydrogen and methane in the new scenario of industrial energy transitions (ALL-TO-GAS).* Líneas Estratégicas 2022. 151,225 €. (12/2022 - 11/2025). P.I. R. Muñoz, **R. Lebrero**.

▪*Demonstration of an Integrated Innovative Biorefinery for the Transformation of Municipal Solid Waste (MSW) into New Biobased Products (URBIOFIN).* European Union Horizon2020 program BBI-

JU. 1,019,025 € (University of Valladolid) / 10,946,366 € (Total budget). (2017-2021). **P.I.: R. Lebrero**, R. Muñoz.

▪ *Advanced Biological Processes for the Purification of indoor air* (BIOPURAIR). Ministerio de Ciencia, Innovación y Universidades. CTM-096441-B-I00. 260,050 €. (2019-2021). P.I. R. Muñoz, **R. Lebrero**.

▪ *Biogas Bioconversion to Commodities and High-Added Value products: Exploring new strategies for biogas valorization* (BioValCH4). Ministerio de Economía y Competitividad. CTM2015-70442-R. 173,030 €. (2016-2018). P.I. R. Muñoz, **R. Lebrero**.

▪ *Sistemas Integrados de Depuración de Biogás, Producción de Biocombustibles y Tratamiento de Aguas Residuales con Tecnologías de Microalgas.* Fundación Iberdrola, Ayudas a la Investigación en Energía y Medio Ambiente. 17,200 € (07/2014-07/2015). P.I. **R. Lebrero**.

C.4. Contracts, technological or transfer merits *(as principal investigator)*

Contracts

- *Preparación y medida de atmósferas con aerosoles biológicos y no biológicos para aplicación en higiene*. BSH Electrodomésticos España, S.A. 38.293€. P.I. **R. Lebrero** (2022-2023).
- *Assessment in the design and operation of odour abatement units*. Engenharia, construçao e manutençao en termoplásticos LDA. (01/03/2021-01/03/2022). 2,200 €. P.I.: **R. Lebrero,** R. Muñoz.
- *Assessment of the energy and abatement performance of large granulometry Filtralite Air*. LECA NORWAY. 10,456.7 € (15/12/2020-15/04/2021). P.I.: **R. Lebrero.**
- *Study and consultancy on the desulfurization capacity of the product FerroBio.* Making Best Colors Chemical Industries SA. 5,000 € (01/11/2020-30/04/2021). P.I.: **R. Lebrero.**
- *Comparative performance evaluation of Filtralite and HMR for malodorous emissions abatement in conventional biofilters and a two-phase biotrickling filter.* LECA NORWAY. 18,527.52 €. (15/01/2020-15/06/2020). P.I.: **R. Lebrero.**
- *Valorization strategies of packaging materials via microbial fermentation*. Societé de Produits Nestle S.A. 756,821 €. (11/2019-12/2021). P.I.: R. Muñoz, **R. Lebrero.**
- *Assessment of the H_2S emissions treatment system of Lesaffre Ibérica and proposals for improving process configuration and optimization.* LESAFFRE IBÉRICA. 4,500 €. (01/11/2019 – 31/03/2020). P.I.: **R. Lebrero.**
- *Comparative evaluation of Filtralite and HMR with conventional packing materials during malodorous emissions abatement.* LECA NORWAY. 18,497.98 €. (01/07/2019-31/12/2019). P.I.: R. Muñoz, **R. Lebrero.**
- *Project of anoxic biofiltration of biogas at pilot scale (AnoxBiofilt).* URBASER S.A. 71,662 €. (01/03/2017 – 01/12/2017). P.I.: **R. Lebrero,** R. Muñoz.
- *Energy valorization of solid waste and effluents: Smart Green Gas*. GAS NATURAL FENOSA. 622,593 €. (01/01/2015-30/06/2018). P.I.: R. Muñoz, **R. Lebrero.**