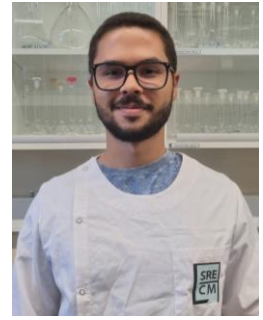


## PhD Candidate Profile

**Name:**

Paulo Henrique Marrocos de Oliveira

**Research Group (if relevant):**

Thermodynamics and Environment

**Research Centre (if relevant):**

Laboratory of Separation and Reaction Engineering – Laboratory of Catalysis and Materials (LSRE-LCM)/ Associate Laboratory in Chemical Engineering (ALiCE)

**Department/School(s) (if relevant):**

Department of Chemical Engineering

**College:**

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**Supervisor(s):**

Dr. Vítor Jorge Pais Vilar (Supervisor)

Dr. Ricardo Jorge Nogueira dos Santos (Co-supervisor)

**Funding body:**

Fundação de Ciência e Tecnologia (FCT), reference 2022.10437.BD

**Area (field) of study:**

Ozonation, NETmix Static Mixer, Computational Fluid Dynamics, Gas-liquid Mass Transfer, Multiphase Flow

**Thesis Title:**

Cutting-Edge Ozone Static Mixer based on a Micro/Meso Structured Pressurized NETmix Reactor: Experimental and CFD Modelling

## PhD Candidate Profile

### Abstract:

The increasing global health concerns due to the surge in urbanization, increasing water contamination and world industrialization, are driving the ozone technology market globally. High O<sub>3</sub> supply demands and bulky size of equipment constitutes a major impediment to the wide spreading of ozone technology in the water treatment sector. This project will address these issues by developing a disruptive low footprint O<sub>3</sub> side stream contacting train for water treatment, integrating a pressurized static micro/meso-structured mixer (NETmix), enabling gas-liquid mass transfer up to 100%, reducing O<sub>3</sub> supply demands and the bulk size of reaction chamber. Computational fluid dynamics (CFD) modelling will be used for the design of the NETmix to boost O<sub>3</sub> dissolution in the water. The mass transfer enhancement will be delivered by increasing the amount of dissolved O<sub>3</sub> in water due to its higher solubility at higher pressure and lower temperature, and by intensifying the degree of gas/liquid mixing.

### Collaborations:

N/A

### Publications:

Paulo H. Marrocos, Igor G.I. Iwakiri, Márcio A.F. Martins, Alírio E. Rodrigues, José M. Loureiro, Ana M. Ribeiro, Idelfonso B.R. Nogueira. A long short-term memory based Quasi-Virtual Analyzer for dynamic real-time soft sensing of a Simulated Moving Bed unit. *Applied Soft Computing*, Volume 116, 2022, 108318. <https://doi.org/10.1016/j.asoc.2021.108318>.

### Presentations:

Reduced-Order Modelling Approach Based on Computational Fluid Dynamics to Predict Gas Hold-up in Micro/Meso Structured Static Mixers. EA3G2022 - International Ozone Association Conference & Exhibition, 28-30 November 2022 (France). Authors: Marrocos, P.H.; Fernandes, I.S.; Pituco, M.M.; Lopes, J.C.B.; Santos, R.J.; Vilar, V.J.P.

NETmix Technology For Ozonation: A CFD Modelling Approach - 4to Congreso Colombiano de Procesos Avanzados de Oxidación, 14-15 April 2021 (Colombia). Authors: Marrocos, P.H.; Fernandes, I.S.; Teixeira, C.A.M; Dias, M.; Santos, R.J.; Lopes, J.C.P.; Vilar, V.J.P.