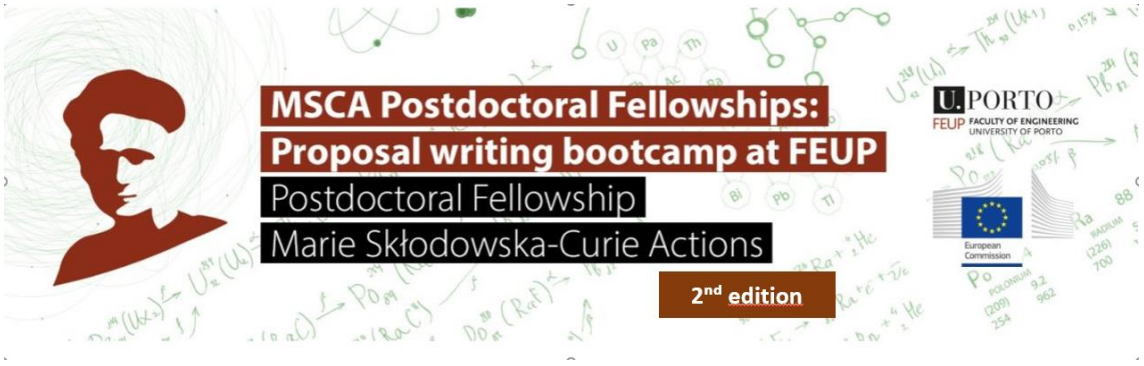
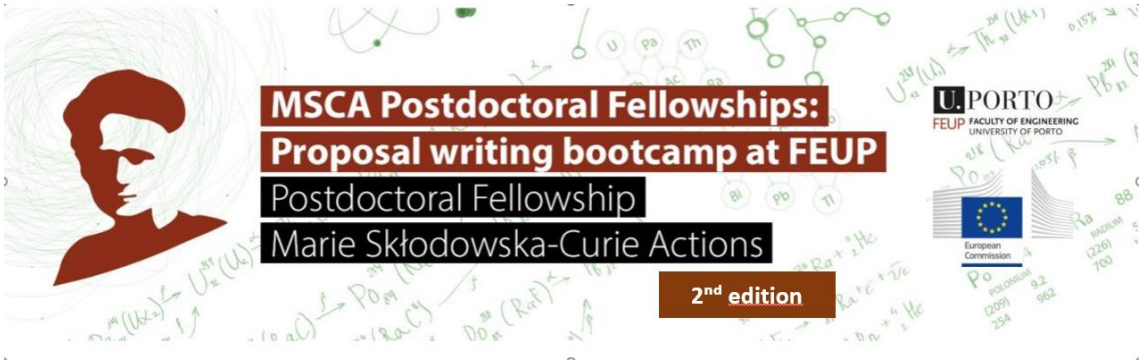


SUPERVISOR INFORMATION	
First and Last name	Cátia Graça
URL of supervisor webpage	https://lsre-lcm.fe.up.pt/person/629
Department	Chemical Engineering
Field(s) of research	Advanced water treatment technologies; Waste Management and Recycling; Development of Catalytic Materials for advanced oxidation processes
PROJECT PROPOSAL	
Title (optional)	Development of totally eco-friendly catalytic membranes for ozone-mediated water treatment

Brief project description

Ozone-based water treatment is widely recognized for its effectiveness in removing contaminants, including organic pollutants and pathogens. However, a **critical challenge** arises during the ozonation process: organic pollutants can break down into by-products that are highly resistant to ozonation, potentially persisting in the environment, posing risks to public health and ecosystems. The main objective of this postdoctoral project is to develop and optimize **sustainable catalytic materials** that can enhance ozonation efficiency, facilitating the degradation of these hard-to-oxidize by-products. For that, sustainable **metal-free catalysts**, focusing on carbon-based materials such as carbon nanotubes and activated carbons will be explored. A significant challenge in this field is making these materials **reusable and easy to recover** after use. To address this, catalysts are usually i**mmobilized onto inert surfaces**, but this often results in a loss of catalytic activity due to the loss of the available surface area to react. The breakthrough idea behind this proposal is to overcome this limitation. The proposed methodology will be based on two main approaches: (i) the synthesis of sustainable carbon-based catalytic materials, and (ii) the immobilization of these catalysts on electrospun nanofiber membranes, a highly efficient process for creating large surface area materials. The catalysts will be synthesized and tested in ozonation reactions in the laboratory to assess their activity and stability. Then, they will be incorporated in **nanofibers made of biopolymers**, creating a new catalytic membrane totally **made of environmentally compatible materials**. This strategy will allow for catalysts reuse without significant loss of efficiency, which consequently enables the application of catalytic ozonation at a larger scale.

The candidate will have the opportunity to learn from leading experts in the fields of water treatment technologies and materials science, whose contributions have been seminal in advancing these areas. Working in this multidisciplinary environment, the candidate will gain



hands-on experience in developing cutting-edge materials, fostering the development of novel solutions for environmental challenges.