

Lead institution: University of São Paulo	
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Recipient: TO BE APPOINTED	Type: Scientific Initiation (IC)
Project title: Simulation and Optimization of Supersonic Gas Separator by Using Finite Element Method	
Research theme area: Computational fluid dynamics, Fluid Mechanics, Compressible Flow, Multiphase flow, FENICS	
<p>Aims</p> <p>The aim of this Scientific Initiation position is to introduce a future post-graduate student (MSc or PhD) to the concepts of finite element simulation applied to the modelling of the flow in a Supersonic Gas Separator. It will be used the FENICS software, a modern platform which performs the finite element simulation based on the equilibrium equations of the medium. Through these simulations new designs of Supersonic Gas Separators will be explored and an geometry optimization will be conducted.</p>	
<p>Objectives</p> <p>The Research Centre for Gas Innovation (RCGI) at the University of São Paulo aims to undertake research and development into new applications of natural gas as well as synergies between gas and other emerging technologies. In order to fulfil these goals, gas separators have to be developed in order to allow the separation of different gases found in the multiphase components of the oil and gas produced at the pre-salt basin in Brazil.</p> <p>The primary objectives and roles of the position are to;</p> <ul style="list-style-type: none"> - Introduce the student to finite element method methods for flow simulation; - Introduce the student to design optimization techniques - simulate the flow field in Supersonic Gas Separators employing FENICS software; - Explore new designs of Supersonic Gas Separator; - Conduct optimization of Supersonic Gas Separator - Investigate the physics of this complex flow. <p>This project would be well-suited to a highly motivated individual, who are an undergraduate student in Mechanical, Mechatronics, Naval, Chemical or Civil Engineering or in Physics. It is required an overall grade above 7.0. Special cases above 6.5/10.0 will be also considered. The student should be enrolled in the 5th, 6th, 7th or 8th Semester of his/her course.</p>	