Buenos Aires
Argentina

December 19, 2023

Dear members of the selection committe,

I am writing to express my strong interest in the PhD position in meteorology with a focus on high-fidelity offshore wind farm modeling at the Department of Earth Sciences. With a background in CFD simulation, particularly focused on wind power, and nearing completion of my 6 year Degree in Mechanical Engineering at the University of Buenos Aires (equivalent to a Master's degree), I am confident that my profile and experience are a great match for your PhD position.

At the moment, I am working on my Engineering thesis titled 'Parametric analysis of actuator disks models to simulate wind farms,' directed by Alejandro Otero and Dimas Barile, from the Renewable Energies Research Group at CSC (Center of Computational Simulations) in Buenos Aires. I have attached a recommendation letter to my application. Through its development, I have acquired and applied my skills in OpenFOAM, as well as in Python scripting to post-process the output data from the CFD simulation. Additionally, in order to run actuator disks besides the ones developed in the research group, I have learned C++ programming to be able to understand and modify parts of OpenFOAM's code and allowing me to develop actuator disks to compare them in a multitude of aspects. At the same time I am carrying out a bibliographic search for models developed, in order to compare them in uniform inlet flow and atmospheric boundary layer conditions. More over, the analysis considers conditions of wake interfearence, in order to compare the capabilities of each model to adjust to typical setups seen in the blibliography. Finally, a brief comparison of computational costs will be made.

At the same time, at Stämm Biotech, an Argentine biotechnology startup, I am carrying out the role of 'Numeric Simulations Specialist'. This role has allowed me in a short time to further enhance my OpenFOAM skills, particularly with its meshing tool snappyHexMesh, extending their application in a different setting than wind power simulation. Furthermore, I have gained knowledge and practice in Object-Oriented Programming, both in further developing in-house simulation programs and applying them in my own post-processing scripts. This role has provided valuable interdisciplinary experiences, learning from people with backgrounds as varied as Biology, Chemistry, and Software Engineering, as well as teaching them from my own expertise in my field of study.

Since my Engineering thesis is due to be finished by July 2024, I would be able to start the PhD in August 2024. In case it is relevant for visa or other formal requirements, I posses EU citizenship, from Spain, as well as my Argentinian citizenship.

My interests are aligned with continuing learning and developing my CFD simulation and development skills. In particular, wind power simulation is a field of special interest, which I have been lucky enough to get to work in through my Engineering thesis. I hope my profile is fit for the position and to hear from you in the near future.

Sincerely,

Juan Ignacio Teich
juanignacioteich@gmail.com
jteich@fi.uba.ar
+54 9 11 6491 6389