Artur Castiel Reis de Souza
Icarusweg 24, 2624 MW
Delft, Netherlands
arturcastiel@gmail.com
0627891600
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Hiring Manager
TNO

Dear Hiring Manager,

I am writing to express my interest in the Scientist position within your Reservoir Modelling & Optimization team at TNO, as advertised. With a strong background in Computational Fluid Dynamics (CFD) for porous media and extensive experience in scientific programming, I am excited about the opportunity to contribute to your projects focusing on efficient and sustainable use of the subsurface.

My academic journey, culminating in a Ph.D. in Civil Engineering with a focus on numerical formulation and reservoir engineering, has been dedicated to studying and developing the necessary skills in physics and computational methods for subsurface reservoir simulators.

Starting from my master's degree, my academic path has been centered on understanding the complexities of the mathematical model and computational methods used on the development subsurface reservoir simulators. During this time, I built a two-phase flow simulator that uses an Implicit Pressure Explicit Saturation (IMPES) approach on general unstructured grids, leveraging Multiscale Finite methods to speed up the simulation by obtaining approximate pressure solutions. As a Ph.D. student, I conceptualized and designed data structures and preprocessing algorithms that formed the backbone of an in-house Python reservoir simulator, which has since been adopted by over 10 fellow researchers within my former research group.

Additionally, as a Visiting Ph.D. Researcher at Swansea University, I had the opportunity to delve into computational geometry, enabling me to pioneer new grid generation algorithms tailored for Multiscale Methods. Moreover, I honed my skills in developing linear and non-linear flux approximation schemes compatible with geological models employing full permeability tensor fields for reservoir simulations.

During my tenure as a Post-Doctoral Researcher at the Delft Institute of Technology, I took on the role of the principal developer for the in-house MATLAB simulator DARSim. Within this poistion, I led the design and implementation of various features, including novel modules for simulating Underground Carbon Capture Storage using Embedded Discrete Fracture Models (EDFM and pEDFM) on general unstructured grids. Furthermore, as a code maintainer, I revamped the workflow and data structure, enhancing compartmentalization to improve scalability and maintainability.

I am particularly drawn to the opportunity to work on diverse projects encompassing geothermal energy, Carbon Capture and Storage (CCS), Underground Hydrogen Storage (UHS), and geothermal energy production. With my proficiency in physics-based modeling for porous media flow, along with my strong skills in scientific programming and software development tools, I believe I can bring valuable expertise to your reservoir modeling team at TNO.

Thank you for considering my application. I am looking forward to the opportunity to discuss how my background, skills, and ambitions align with the needs of your team. Please find my detailed CV attached for your reference.

Warm regards,

Artur Castiel Reis de Souza