

**Dr. ARTUR CASTIEL REIS DE SOUZA**

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**Scientific Programmer & Expert in CFD for Porous Media**

Find more information at my website: [arturcastiel.github.io](https://arturcastiel.github.io/)

**About**

Specialist in Computational Fluid Dynamics for multiphase flow on subsurface porous media. Skilled in scientific programming and reservoir modeling with a track record of delivering high quality results. Experienced developing state of the art technology in the fields of Grid Generation and Adaptation, Numerical Methods, Linear Non-linear Flux Approximation, Multiscale Methods, Fractured Media Modeling. Easy going with excellent communication skills.

**EXPERIENCE**delft institute of technology  
Post-Doctoral Researcher - Delft, Netherlands – Since 2022

* Current main developer of in-house MATLAB simulator DARSim. Developed unstructured grid module for Underground Carbon Capture Storage simulation using Embedded Discrete Fracture Models (EDFM and pEDFM).

UNIVERSIDADE TIRADENTES  
Assistant Lecturer **–** Recife, Brazil, First Semester 2022

Subject: Dynamic Modelling and Heat Transfer disciplines.

Universidade federal de pernambuco

PhD Researcher - Recife, Brazil – 2018 to 2022

* Creator and main developer of in-house Python simulator. Developed consistent Multiscale Finite Volume method to speed up simulation on unstructured grids. Development of linear and nonlinear flux approximation schemes. Managed and trained a team with 3 undergraduate students involved in the project.

SWANSEA UNIVERSITY

Visiting PhD Researcher - Collaboration between Brazil and UK Research Groups

Swansea, United Kingdom- 2020 to 2021

* Developed of a general-purpose grid generation algorithm for the creation unstructured dual meshes of Multiscale.

Universidade federal de pernambuco  
MSc Researcher – Recife, Brazil – 2015 to 2018

* Development of a two-phase flow simulator based on a IMPES strategy using Multiscale Finite Volume method as an approximate pressure solver.

FACULDADE MAURICIO DE NASSAU

Instructor – Recife, PE, Brazil, 2014 to 2015  
Subjects: CAD/CAM, Auto Cad, Introduction to Programming, and Computer Networks.

**EDUCATION**

Universidade federal de pernambuco

Recife, Pernambuco - Brazil – 2018 to 2022

PhD in Civil Engineering - GPA 4.0/4.0

SWANSEA UNIVERSITY

Visiting PhD Student

Swansea, Wales, United Kingdom – 2020 to 2021 2021

Universidade federal de pernambuco  
 Recife, PE - Brazil – 2015 to 2018,

MSc in Civil Engineering - GPA 3.9/4.0

Universidade de pernambuco

Recife, PE - Brazil – 2006 to 2012

BSC in Mechanical Mechatronics Engineering,

**AWARDS**

* ABMEC Award for Best Doctoral Thesis of the Year - Honorable Mention, Brazilian Association for Computational Methods in Engineering.
* i-LITPEg Award - Award for Best Thesis of the Year 2023, Brazil, Institute of Petroleum and Energy Research.
* PhD scholarship, Energi Simulation Foundation.
* Visiting PhD student in Swansea University, National Council for Scientific and Technological Development (CNPq).

**SKILLS**

**Scientific Programming:** MATLAB, Python, Numpy, Scipy, C/C++, Object-oriented and Array

programming, Git, Latex, Linux,Visit, ParaView, Inkscape, GIMP

**Technology:** Docker, Raspberry Pi, Ubuntu,

HTML, CSS, Bootstrap, Javascript.Autodesk AutoCad, Autodesk Inventor, Microstation, Ansys

**Languages:** Native Portuguese Speaker, Fluent in   
English, Advanced French and Spanish, and Intermediary German skills.

**VOLUNTEER WORK**

Engaged in diverse volunteer initiatives focusing on humanitarian aid and community development in Brazil.

* GADE founding member: Development of projects aimed at addressing social and economic challenges of refugee and poor communities in Brazil and Haiti.
* Rotaract Club Recife, Recife, Brazil: Participated in community service projects focused on local and international humanitarian needs.
* AIESEC – Recife, Brazil: Contributed to youth development and cultural exchange programs, fostering global understanding and cooperation.

**RELEVANT PUBLICATIONS**

* Cavalcante, T.M.; **Souza, A. C. R**.; Hajibeygi, H; Carvalho , D. K. E.; Lyra, P. R. M.; Simulation of Two-Phase Flow in 3D Fractured Reservoirs Using a Projection-Based Embedded Discrete Fracture Model on Unstructured Tetrahedral Grids (pEDFM-U) , Advances in Water Resources (2024)
* **Souza, A. C. R.**; Carvalho, D. K. E.; Cavalcante, T.M.; Contreras, F. R. L.; Edwards, M. G.; Lyra, P. R. M.; A nonlinear repair technique for the MPFA-D scheme in single-phase flow problems and heterogeneous and anisotropic media, Journal of Computational Physics (2024)
* Santos, J. C. A.; Lyra, P. R. M.; Andrade, J. P. R.; **Souza, A. C. R**.; Lira Filho, R. J. M.; Carvalho, D. K. E.; An Algebraic Dynamic Multilevel and Multiscale Method with Non-Uniform Mesh Resolution and Adaptive Algebraic Multiscale Solver Operator for the Simulation of Two-Phase Flows in Highly Heterogeneous Petroleum Reservoirs, Journal of Computational Physics (2022)
* **Souza, A. C. R.**; Carvalho, D. K. E.; Santos, J. C. A.; Willmersdorf, R. B.; Lyra, P. R. M.; Edwards, M. G. An algebraic multiscale solver for the simulation of two-phase flow in heterogeneous and anisotropic porous media using general unstructured grids (AMS-U) , Applied Mathematical Modelling (2022)
* **Souza, A. C. R.**; Barbosa, L. M. C.; Contreras, F. R. L.; Lyra, P. R. M.; Carvalho, D. K. E. A multiscale control volume framework using the multiscale restriction smooth basis and a non-orthodox multi-point flux approximation for the simulation of two-phase flows on truly unstructured grids, Journal of Petroleum Science and Engineering (2020)
* Silva, R.N.T.; MATOS, G. M.; **Souza, A. C. R.;** LIRA FILHO, R. J. M.; Carvalho, D. K. E. de; Lyra, P. R. M., . Some Results on the Accuracy of a Classical Upscaling Technique Using an Intuitive Mul-tilevel Preprocessor for Smart Simulation, CILAMCE (2020) - Ibero-Latin American Congress on Computational Methods in Engineering
* Santos, J. C. A.; Andrade, J. P. R.; **Souza, A. C. R**.; Lira Filho, R. J. M.; Carvalho, D. K. E. de; Lyra, P R M An Adaptive Algebraic Dynamic Multilevel (A-ADM) and Multiscale Method with Enriched Basis Functions for the Simulation of Two-Phase Flows in Highly Heterogeneous Petroleum Reservoirs, CILAMCE (2020) - Ibero-Latin American Congress on Computational Methods in Engineering