**Dr. ARTUR CASTIEL REIS DE SOUZA**

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

**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.

**RESEARCH EXPERIENCE**delft institute of technology  
Delft, South Holland, Netherlands, Since 2022

* Study and development of methods for the generalization of embedded fracture model and variations to general unstructured grids.

**EDUCATION**

Universidade federal de pernambuco

Recife, Pernambuco - Brazil - July, 2022

PhD in Civil Engineering - GPA 4.0/4.0-

* Development of computational fluid dynamics methods for fluid flow in porous media. Development of linear and non-linear Finite Volume and Multiscale Finite Volume schemes for unstructured grids.

SWANSEA UNIVERSITY

Swansea, Wales, United Kingdom - February 2020 to February 2021

Visiting PhD Student

* Development of a general purpose algorithm for the creation unstructured dual meshes using techniques of computational and the development repair techniques to ensure the discrete maximum principle and eliminate spurious oscillation from linear Multi-Point Flux Approximation schemes.

Universidade federal de pernambuco Recife, PE - Brazil

Recife, PE - Brazil - January 2019,

MSc in Civil Engineering (GPA 3.9/4.0)

* Development of a Multiscale Finite Volume method for the simulation of two-phase flow in unstructured grids using Multi-Point Flux Approximation schemes.

Universidade de pernambuco

Recife, PE - Brazil – May 2012

BSC in Mechanical Mechatronics Engineering,

**AWARDS**i-LITPEg Award - Award for Best Thesis of the Year 2023, Brazil, Institute of Petroleum and Energy Research

* ABMEC Award for Best Doctoral Thesis of the Year - Honorable Mention, Brazilian Association for Computational Methods in Engineering
* 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  
**Languages:** Native Portuguese Speaker, Fluent in English (IELTS score 7.5/9), Advanced French and Spanish, and Intermediary German skills.

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

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

**Teaching experience**UNIVERSIDADE TIRADENTES  
Recife, PE, Brazil, February 2022 to August 2022  
**Assistant Lecturer**Subject: Dynamic Modelling and Heat Transfer disciplines.  
  
UNIVERSIDADE DE PErnAMBUCO  
Recife, PE, Brazil - August 2017 to December 2017  
**Assistant Lecturer**   
Subject: Electricity and Electromagnetic Physics disciplines.

Faculdade maurício de nassau

Recife, PE - Brazil - August 2014 – July 2015

Instructor, Telecommunications Technician Course

Subjects: CAD/CAM, Auto Cad, Introduction to Programming, and Computer Networks

**RESEARCH INTEREST**

Computational Fluid Dynamics, Fluid Flow in Porous Media, Petroleum Reservoir Simulation, Grid Generation and Adaptation, Numerical Methods: Linear and Non Linear CVD-MPFA Finite Volume, Finite Elements, Mixed Finite Elements, Multiscale Finite Volumes Methods.

**PUBLICATIONS**

* **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 (2022)
* Cavalcante, T.M.; Lira Filho, R. J. M.; **Souza, A. C. R.**; Carvalho , D. K. E.; Lyra , P. R. M.; A Multipoint Flux Approximation with a Diamond Stencil and a Non-Linear Defect Correction Strategy for the Numerical Solution of Steady State Diffusion Problems in Heterogeneous and Anisotropic Media Satisfying the Discrete Maximum Principle , Journal of Scientific Computing (2022)
* 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)
* **Souza, A. C. R.;** Cavalcante, T. M.; Carvalho, D. K. E.; Lyra, P. R. M., Edwards, M.G. Numerical Simulation of the Diffusion Equation Via a Non-Linear Flux Splitting Technique with the Multipoint Flux Approximation Method with a Diamond Stencil Satisfying the Discrete Maximum Principle Using 2-D Unstructured Meshes , COBEM (2021) - Proceedings of the 26th International Congress of Mechanical Engineering
* 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
* Juvito, L.B. ; Ramirez, G. G. ; **Souza, A. C. R.** ; Carvalho, D. K. E. de ; Lyra, P. R. M. An iterative MsCV method coupled to the high-resolution CPR approach via different solution smoothers for the simulation of oil-water flows in 2D petroleum reservoirs on unstructured grids. , CILAMCE (2020) - Ibero-Latin American Congress on Computational Methods in Engineering
* **Souza, A. C. R.**; Barbosa, L. M. C.; Carvalho, D. K. E.; Lyra, P. R. M. A MsCV framework using a non-orthodox MPFA-D for the simulation of two-phase flows on truly unstructured grids , CILAMCE (2017) - Ibero-Latin American Congress on Computational Methods in Engineering.