To whom it may concern August 2, 2018

Dear Sir or Madam,

I am very interested in the opportunity posted as "CFD Engineer". I strongly feel that this is an opportunity where I can apply my education and professional experience, as you will see in my Resume (attached). Thus far, I have spent the last years working in the manufacturing field combined with my wide expertise in my professional life as an active researcher in fields closely related to Mechanical Engineering, in particular the field of Fluid Mechanics and Materials modeling and applying numerical simulation techniques to solve the various engineering tasks that I have come across. My expertise in engineering design and numerical calculations ranged from analysis, performance, and optimization studies in; compressible and in-compressible flow (subsonic and supersonic) in different 3D geometries (competition cars, airplanes, airfoils, nozzles, etc), boundary layer flow (aerodynamics, wall function modeling, numerical wind tunnel testings), Atmospheric, Jets, and injectors flow; using LES and DES methods. Also, I have worked in Multi-phase flow (Euler/Euler Euler/Lagrange Methods), turbulent reacting flow (combustion). In addition, I have worked in Heat transfer simulations for different configurations; fluid dynamics, fluid/structure interactions and structural mechanics. Multi-physics problems (electrochemical, heat transfer flux, fluid flow). Wind turbines (horizontal and vertical axis), fans (axial and centrifugal flow), water turbines (Pelton, Kaplan, Francis). Mechanical vibrations analysis (modes of vibrations, fatigue, and failure), Structural analysis in mechanical systems (strain, stresses, live, failure). I have also developed during my professional career different skills in 3D engineer design using CAEs, CADs; as Catia, SolidWorks. In addition, I have developed very good skills programming Finite Element (FEM) and Finite Volume methods (FVM) with Fortran, C++, and Matlab Languages. Currently and for the last 9 years I have been working with OpenFOAM free code on Linux operating system, Fluent, ANSYS WORKBENCH, GID, Abaqus. Finally, I use ICEM and Gambit as meshing tools.

I appreciate you taking the time to look over my Curriculum Vitae, and I hope this could be the perfect ocasion to joint this company.

Sincerely,

Leonard Duenas, PhD

Attached: curriculum vitæ

Leonard Duenas, PhD

Curriculum Vitae

"God is good all the time"

Experience

Vocational

2016-Present **Research and Development Engineer**, E=MC4I Inc., North Charleston, SC.
- Design, Fabricate, and Simulate communication assemblies for DoD projects, using CADs and numerical tools.

Detailed duties:
- Design 3D geometries based on the drawings provided by the costumer, using CADs as; Solid Works, Catia, GID.
- Generate 3D real geometry meshes using meshing tolls as; Gambit, ICEM.
- Perform numerical simulation researches (Fluid flow, heat transfer, structural mechanics,fracture mechanics and failures, vibrations analysis, using free codes as OpenFoam, and commercial codes as; Fluent, CFX, Ansys package,GID).

2010-2015 **Research assistant**, LABORATORY OF RESEARCH IN FLUID DYNAMICS AND COMBUSTION TECHNOLOGIES, LIFTEC, Zaragoza,Spain.
Develop and program new subroutines (C++ language) to perform numerical simulations (multiphysic problems) using Open Foam to resolve a complete stack of a PEM fuel cell.

Detailed duties:
- Generate 3D structured meshes (hexahedral elements) on real PEM fuel cell geometries using meshing tolls as; Gambit, ICEM.
- Perform numerical simulation researches (Fluid flow, heat transfer, structural mechanics, using free codes as OpenFoam, and commercial codes as; Fluent, CFX, Ansys package,GID).

2009-2010 **Col-Sciences Young Researcher**, AUTÓNOMA OF OCCIDENTE UNIVERSITY, Cali, Colombia.
- Perform Jet numerical simulations using Fluent to resolve the jets flow structure in steady state flow and unsteady. compare the numerical structure against the experimental.
- Perform atmospheric numerical simulations on buildings.
- Perform numerical simulations on turbo machineries.
- perform aerodynamic numerical simulations in submerged objects in laminar and turbulent flow.

Detailed duties:
- Generate 3D strutured and unstructured meshes on complex geometries (Jets,wind turbines, entire buildings, cars) using meshing tolls as; Gambit, ICEM.
- Perform numerical simulations using commercial codes (Fluent, Ansys CFX) and programming subrutines using (C++ or Fortran).

2008-2009 **UAO Young Researcher**, AUTÓNOMA OF OCCIDENTE UNIVERSITY, Cali, Colombia.
- Perform numerical simulations using Fluent to resolve numerically flow pattern, thermal and velocity boundary layers over cars and airplanes, using commercial codes as; Fluent, Ansys CFX.
- Obtain the Lift and drag coefficient and compare with the theoretical bibliography.
- perform aerodynamic numerical simulations on submerged objects in laminar and turbulent flow.

Detailed duties:
- Generate unstructured mesh on 3D complex geometries (cars and airplanes) using meshing tolls as; Gambit, ICEM. In addition, realize a prism layer over the surfaces to be able to resolve the boundary layer correctly.

Education

2011-2015 **PhD in Fluid Mechanics**, *Zaragoza University*, Zaragoza, Spain, *GPA - 4.0*.
Cum Laude

2010-2011 **Master in Applied Mechanics**, *University of Zaragoza*, Zaragoza, Spain, *GPA - 4.0*.

2008-2010 **Master in Numerical Methods for Computing and Engineering Design**, *CIMNE, University of Catalonya*, Barcelona, Spain, *GPA - 3.7*.

2003-2007 **Bachelor of Mechanical Engineering**, *Autónoma of Occidente University*, Zaragoza, Spain, *GPA - 4.0*.

PhD Thesis

Title *3D Non-isothermal numerical simulation of a high temperature fuel cell.*

Supervisors Radu Mustata & Luis Valiño

Description The objetive of this thesis is to develop a computational tool, with detailed physical models (non-isothemral), to perform the behavior in steady state of a PEM fuel cell of high temperature in realistic 3D geometries and realistic work conditions, developed on a free distribution code.

Journal papers

1. L. Valiño, R. Mustata, L. Dueñas, Consistent modeling of a single PEM fuel cell using Onsager's principle. Int. Journal of Hydrogen Energy. 39 (8) 2014, 4030-4036.
2. L. Valiño, R. Mustata, L. Dueñas, 3D non-isothermal numerical simulation of a high temperature fuel cell. Int. Journal of Hydrogen Energy. -currently on review-.

Research projects

1. Project Title: Numerical simulation and Modeling due to Finite elements free code of a polymeric cell of high temperature. FINANCING AGENCY: Competitivity and Economy Ministry, ENE2011-29731- C05- 01 (14.520 Euros) DURATION FROM: January 1 2012 UNTIL: december 31 2012 HEAD RESEARCHER: Dr. L. Valiño, (LITEC-CSIC).

Congress papers

1. L. Valiño, R. Mustata, L. Dueñas, 3D non-Isothermal numerical simulation of a high temperature fuel cell. Barcelona, Spain Octuber 15-17, 2014.
2. L. Valiño, R. Mustata, L. Dueñas, Consistent modeling of a single PEM fuel cell using Onsager's principle. Madrid, Spain November 21-23, 2012.
3. R. Mustata, L. Valiño, L. Dueñas, A 3D Numerical Study of a Forced Air Breathing PEM Fuel Cell Stack, HYCELTEC 2011,Proceedings, Zaragoza, Spain, 27-30 June,2011.
4. A. Aponte, A. Toro, L. Dueñas, S. Laín, M. Peña, Análisis de las condiciones de frontera en superficie para la simulación hidrodinámica de lagunas facultativas secundaria. Proc. 8th IWA Specialist Group Conference on Waste Stabilization Ponds, Belo Horizonte (Brazil) 26-30 April, 2009.

Attendance at conferences and seminars

1. 1st Seminar on Modern manufacturing Technologies. Cali (Colombia). November 28-29, 2005.
2. Fundamentals, Modeling and industrial Applications of Multiphase Flow. Cali (Colombia). November 4-6, 2008.
3. Symposium on Hydrogen, Fuel Cells and Advanced Batteries (HYCELTEC), Zaragoza Spain Junio 26-29, 2011.
4. Simulation of complex flows: Large scale DNS and LES of gaseous and two-phase flows. Madrid, Spain April 16 and 17, 2012.
5. Congress of Spanish Association of Fuel Cells (CONAPPICE). Madrid, Spain November 21-23, 2012.
6. Congress of Spanish Association of Fuel Cells (CONAPPICE). Barcelona, Spain October 15-17, 2014.

Teaching experience

1. Assistant Professor of computational area of the next subjects: Computational Mechanics, Heat Transfer and Aerodynamics. Autonoma of Occidente University. Cali, Colombia, 2007-2008.

Reports and memories

1. L. Dueñas: Numerical Simulation of Turbulent Flow around immersed objects. Graduate Thesis presented at the Autÿnoma University for obtaining the degree of Mechanical Engineer (February, 2008).

2. L. Dueñas: Polarization Curve of Proton Exchange Membrane of a Fuel Cell due to numeric simulations with free software. Master Thesis presented at the Zaragoza University for obtaining the degree of Applied Mechanics (September, 2011).

3. L. Dueñas: 3D non-Isothermal numerical simulation of a high temperature Pro- ton Exchange Membrane of a Fuel Cell. PhD thesis dissertation presented at Zaragoza University for obtaining the Philosophy Degree in Fluid Mechanics (Jan- uary, 2015).

Languages

Spanish **Mothertongue**

English **Proficient**

References

1. Eduardo Gomez, ME and CE
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3. Dr. Radu Mustata
   Senior Researcher CSIC
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