Alejandro Mejia

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EDUCATION

West Virginia University, Morgantown, WV — August 2024
Doctor of Philosophy in Materials Science and Engineering
Overall GPA: 4.0

West Virginia University, Morgantown, WV — August 2017
Master of Science in Aerospace Engineering
Overall GPA: 3.7

Universidad Pontificia Bolivariana, Medellin, COLOMBIA — February 2015
Bachelor of Science in Aeronautical Engineering
Overall GPA: 4.2/5.0

WORK EXPERIENCE

West Virginia University, Morgantown, WV — September 2024 – Current
Postdoctoral Fellow

- Constructing models of ceria-based electrolysis cells using INL's MOOSE package.
- Implementing sequential Monte Carlo samplers for estimation of parameters from experiment.
- Overseeing and coordinating graduate students.
- Preparing software repository for public release.

West Virginia University, Morgantown, WV — January 2016 – May 2024
Graduate Research Assistant / Graduate Teaching Assistant

- Teaching assistant for MAE 316 Analysis of engineering systems course using MATLAB.
- Energy Systems and Materials Simulation (ESMS) group: research focused on computer modeling, numerical methods implementation, data analysis, and machine learning code development.
- Developed project using Bayesian statistics calibration routines with Markov chain Monte Carlo sampling methods on modeling engineering systems applied to a dynamic virus model (use of gPPROMS process modelling software).
- C++ and MATLAB coding environments on MacOS, Windows, and Linux Operating Systems.
- Modeling high-temperature CO_2 catalysts using the Multi Physics Object-Oriented Simulation Environment (MOOSE) FEA framework, coupled with Sequential Monte Carlo methods.

Institute of Energy and Thermodynamics UPB, Medellin, COLOMBIA — August 2014 – February 2015
Researcher

- Research focused on aerodynamics and renewable energy projects (wind turbines).
- Completed a preliminary design for a portable vertical axis wind turbine (VAWT) for use in remote areas.
- Computational fluid dynamic (CFD) simulations of a wind turbine rotor using ANSYS Fluent FEA software.
- Computer aided design and drawing of the wind turbine components using SolidEdge CAD software.
- Published technical paper with results in the Colombian Air Force journal (TecnoESUFA ISSN 1900-4303 Vol. 23).

Aerospace DesignWorks, Ltd, Bogota, COLOMBIA — January 2014 – April 2014
Assistant Design and Drafting Engineering Intern

- Assisted engineering tasks in technical aircraft interior design drawings, mainly for seat tracks and galleys.
- Worked on computer aided drafting/drawing modifications using AutoCAD software.
- Performed stress analysis of conceptual seat track components using SolidWorks and CATIA software.
- Reviewed applicable national (RAC) and international (FAA) aviation regulations.

TECHNICAL SKILLS

Programs: MATLAB, SolidEdge, C++, Python, High-Performance Computing (HPC) environments, ANSYS Fluent, AutoCAD, SolidWorks, MS Office (Word, Excel, PowerPoint)

Languages: Spanish

ADDITIONAL EXPERIENCE/ACTIVITIES

Academia Antioqueña de Aviacion, Colombia August 2007 – November 2008
Private Pilot License

- PPA-2839 issued by UAEAC (February 13, 2009)

Industrial Outreach Program In Mexico, WVU Study Abroad June 2017 – August 2017
Graduate Assistant

- Mentoring and supervision of 21 undergraduate students during 3-month study abroad program. Overview and advising of internship projects with 12 engineering companies in Queretaro, Mexico.

Aeronautical Engineering Research Group, UPB January 2010 – May 2011
Group Member

- Participation in research group involved in various undergraduate research projects on gliders, UAVs, and hydrofoils.

COMPLETED GRADUATE COURSEWORK

- MAE 515 Analytical Methods in Engineering
- MAE 532 Dynamics of Viscous Fluids
- MAE 580 Crystallography and Crystals
- MAE 583 Thermodynamics and Kinetics of Materials
- MAE 593B Autonomous Robot Systems
- MAE 593N Solid State Ionics
- MAE 660 Feedback Control in Mechanical Engineering
- MAE 686 Materials Science and Engineering Seminar
- MAE 694 Microscopy of Materials
- MATH 522 Numerical Solution of PDEs
- STAT 561 Theory of Statistics 1

PUBLICATIONS AND CONFERENCES

[1] **Mejia, A.**, Mebane, D. S., Investigation of Space Charge Effects on CO_2 Electrocatalytic Reduction on Gd-Doped Ceria Via Scanning Kelvin Probe and Model-Based Bayesian Analysis. *In Progress*

[2] Vahidi, H., **Mejia, A.**, Xuan, S., Cassiadoro, A., Mebane, D. S., Bowman, W. J., Which Interfaces Matter Most? Identifying Fast- and Slow-Conducting Grain Boundaries via Local Defect Chemistry in a Concentrated Solid Electrolyte. *Preprint* 2024

[3] Tong, X., Bowman, W. J., **Mejia-Giraldo, A.**, Crozier, P. A., Mebane, D. S., A New Data-Driven Interacting-Defect Model Describing Nanoscopic Grain Boundary Compositions in Ceramics. *J. Phys. Chem. C* 2020, 124, 43, 23619-23625

[4] Nieto-Londoño, C., **Mejia-Giraldo, A**., Computational study of a Savonius-type three bucket rotor for use in vertical axis wind turbines. (2015) *TecnoESUFA: Revista De Tecnologia Aeronautica*, 23.

Oral Presentations:

"Novel Model-Building Tools for the Development of Near-Surface MIEC Emulators for HT CO_2 Electrolysis Cells." 23rd International Conference on Solid State Ionics (*DT25: Mixed Conductors II*). July 2022. Boston, MA.

"Developing data-driven models to study electrocatalytic CO_2 reduction on ceria."
236th ECS Meeting (*IO3: Ionic and Mixed Conducting Ceramics*). October 2019. Atlanta, GA.

"Developing computational tools for data-driven model building used in studying electrocatalytic CO_2 reduction processes."
23rd Annual Green Chemistry & Engineering Conference and 9th International Conference on Green and Sustainable Energy (*Catalysis for CO_2 conversion*). June 2019. Reston, VA.

REFERENCES

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