ALAN MARQUEZ-RAZON

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Skills

➤Programming: C++, Matlab, Python, Rust, FORTRAN, Git
➤Numerical Methods for Engineering problems and multi-physics simulations
➤Computational Fluid Dynamics ➤Solid Mechanics ➤Thermal Analysis
➤Fluid-Structure Interactions ➤Structural Analysis ➤Structural Design
➤Prototyping ➤Dynamics Analysis ➤Reduced Order Modeling
➤Software: SOLIDWORKS, FEMAP, Ansys, Houdini, NASTRAN, Adobe
➤Languages: English, Spanish

Experience

Vanderbilt University Department of Computer Science
Post-Doc Researcher under **David Hyde** **Aug 2022- Dec 2023**
Investigation of the use of the material point method (MPM) for sharp interfaces. Expand the utility and applicability of MPM to real-world problems. Physical interfacial problems from physical science and engineering.

Jixie Effects
Software Engineer under **Theodore Gast** **Feb 2022- Aug 2022**
Develop Material Point Method software and material models.

UCLA Department of Mathematics
Graduate Student Researcher under **Joseph Teran** **Jan 2020- Dec 2021**
Investigation of the use of the material point method (MPM) for fluid-structure simulations. Support of the in house codebase, develop and implement a wide variety of C++ functions including level sets, fast sweeping algorithm, hybrid Lagrangian/Eulerian methods for fluid simulation, surface tension for MPM, conservative transfers for MPM and hybrid method for collisions using finite elements and MPM.

UCLA Department of Mechanical and Aerospace Engineering
Graduate Student Researcher under **Oddvar Bendiksen** (retired) **June 2016- June 2017**
Investigation: Aeroelasticity benchmark work for the next generation of high transonic and supersonic aircraft. This included CAD modeling for a wing tunnel model. Validating finite elements to appropriate model the wing tunnel model in the experiment, coding and comparing the data to experimental results.

California Institute of Technology, Jet Propulsion Laboratory
Aerospace Engineering Intern under **James Lewis** **Nov 2015- April 2016**
Support the Mars Oxygen IRSU Experiment (MOXIE). Focusing on the flow processes and instrumentation systems. Handled CAD modeling using SOLIDWORKS, equipment maintenance, inventory, and 3D printing of the MOXIE prototype.

SDSU Department of Aerospace Engineering, Laboratory
Assistant Researcher under **Luciano Demasi** **May 2011 – Jun 2013**
Investigation: Nonlinear Analysis of Prandtl Plane Joined Wings. Finite Element Modeling and Analysis of static nonlinear joined wing configurations. MATLAB coding of a dynamic aeroelastic instability (flutter) solver for non-planar high subsonic flow using the

doublet lattice method. Analyzed diverse wing configurations under different flight conditions to obtain the properties desired for given test cases.

Education

Vanderbilt University
Postdoctoral researcher Computer Science **2022-2023**
UNIVERSITY OF CALIFORNIA LOS ANGELES (UCLA)
Doctor of Philosophy Mechanical and Aerospace Engineering **2015-2021**
Master of Aerospace Engineering **2013-2015**
SAN DIEGO STATE UNIVERSITY (SDSU)
B.S. Aerospace Engineering, Minor Mathematics **2008-2013**

Teaching Experience

UCLA
Teaching Assistant under Dr. Toohey Damian,"**Flight Mechanics**" **2015-2016, 2017-2019**
Teaching Assistant under Dr. Oddvar Bendiksen,"**Aeroelastic effects on structures**" **2016**
Teaching Assistant under Dr. Oddvar Bendiksen, "**Preliminary Aircraft Designs**" **2015**
SDSU
Teaching Assistant under Dr. Luciano Demasi, "**Statics**" **2012**

Publications

1. "A Robust Grid-Based Meshing Algorithm for Embedding Self-Intersecting Surfaces" ,Steven W. Gagniere, Yushan Han, Yizhou Chen, David A. B. Hyde, **Alan Marquez-Razon**, Joseph Teran, Ronald Fedkiw. **Computer Graphics Forum** Vol 43 Issue 1 https://doi.org/10.1111/cgf.14986 **2023**
2. "A Linear and Angular Momentum Conserving Hybrid Particle/Grid Iteration for Volumetric Elastic Contact" **Alan Marquez Razon**, Yizhou Chen, Yushan Han, Steven Gagniere, Michael Tupek, Joseph Teran. **Proceedings of the ACM on Computer Graphics and Interactive Techniques** Vol 6 Issue 3 Pages 1-25 ACM https://doi.org/10.1145/3606924 **2023**
3. "A Momentum-Conserving Implicit Material Point Method for Surface Energies with Spatial Gradients", J Chen, V Kala, **A Marquez-Razon**, E Gueidon, DAB Hyde, J Teran. **ACM Transactions on Graphics (TOG)** Vol 40 Issue 4 Pages 1-16 ACM https://doi.org/10.1145/3450626.3459874 **2021**
4. "Particle Grid Hybrid Methods for Multi-Material Dynamics" **Marquez Razon, Alan**. University of California, Los Angeles **ProQuest Dissertations Publishing**, **2021**
5. "An implicit updated lagrangian formulation for liquids with large surface energy", David Hyde, Steven Gagniere, **Alan Marquez-Razon**, Joseph Teran **ACM Transactions on Graphics (TOG)** 39 (6), 1-13, https://doi.org/10.1145/3414685.3417845 **2020**
6. "A Hybrid Lagrangian/Eulerian Collocated Advection and Projection Method for FluidSimulation", Steven Gagniere, David Hyde, **Alan Marquez-Razon,** Chenfanfu Jiang, Ziheng Ge, Xuchen Han, Qi Guo, Joseph Teran, **Symposium on Computer Animation** (SCA), https://doi.org/10.1111/cgf.14096 **2020**
7. "Phenomenology of nonlinear aeroelastic responses of highly deformable joined wings", Rauno Cavallaro, Andrea Iannelli, Luciano Demasi and **Alan Marquez Razon**.

Advances in Aircraft and Spacecraft Science, An International Journal. DOI: 10.12989/aas.2015.2.2.125 **2015**

8. "Phenomenology of Nonlinear Aeroelastic Responses of Highly Deformable Joined-wings Configurations", Rauno Cavallaro, Andrea Iannelli, Luciano Demasi and **Alan Marquez Razon**, **AIAA Journal**. https://doi.org/10.2514/6.2014-1199 **2014**
9. "Postcritical analysis of PrandtlPlane joined-wing configurations" Luciano Demasi, Rauno Cavallaro, **Alan Márquez Razón**. **AIAA journal** Vol 51 Issue 1 pages 161-177 American Institute of Aeronautics and Astronautics https://doi.org/10.2514/1.J051700 **2013**

Awards

Vanderbilt University NSF MPS-Ascend Postdoctoral Fellowship	**2022 - 2023**
SDSU Minority Biomedical Research Support (MBRS) Scholar	**2012 - 2013**
SDSU NSF STEM scholar	**2011 - 2012**

References

1. **Jeff Eldredge**, UCLA Professor MECHANICAL AND AEROSPACE ENGINEERING , Email: eldredge@seas.ucla.edu Phone: (310) 206-5094
2. **Luciano Demasi,** SDSU Professor AEROSPACE ENGINEERING Email: ldemasi@sdsu.edu Phone: 619-594-3752
3. **Joseph M. Teran**, UC Davis Professor Mathematics Email : jteran@math.ucdavis.edu