CARLOS A. GONZALEZ

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EDUCATION

Stanford University *2020 - Present*
Ph.D. Candidate in Mechanical Engineering
Center for Turbulence Research

M.S. Mechanical Engineering *2018 - 2020*

California Institute of Technology *2013 - 2017*
B.S. Mechanical Engineering

EXPERIENCE

Graduate Research Assistant under Parviz Moin June 2019 - Present
My research is in the development of novel reduced-order models for laminar and transitional flows using computational fluid dynamics. Specifically, I have developed a new wall model for laminar flows that can be coupled to the parabolized stability equations to model the transition portion. These models have shown an estimated cost savings of 250 times fewer CPU hours as compared to the standard modeling practices. Through this research, I have developed experience with HPC platforms, parallel programming, and the implementation of advanced numerical methods.

Research Intern at the Palo Alto Research Center June 2021 - September 2021
Performed theoretical and simulation-based analysis for the design of multi-physics experiments related to liquid-metal 3D printing technology. Liquid-metal/air multiphase simulations were performed with COMSOL using the diffuse-interface Cahn-Hilliard equation. Additionally, I developed a new OpenFoam solver with a Lorenz body force to evaluate magnetohydrodynamic effects.

PUBLICATIONS

Gonzalez, C.A., Harris, S.R., & Moin, P. (2023). "Simulating an H-type transitional boundary layer in a coupled NLPSE and WMLES framework with a Falkner-Skan wall model," Center for Turbulence Research, *Annual Research Briefs, 2023.*

De Broeck, L., Gortz, S., Flint, T., Gonzalez, C.A., Lele, S.K., & Oberlack, M. (2022). "Suppression of acoustic instabilities in boundary layer flows," Center for Turbulence Research, *Proceedings of the Summer Program,* 2022.

Gonzalez, C.A., Harris, S.R., & Moin, P. (2021). "Falkner-Skan wall model baseflow generation for the parabolized stability equations," Center for Turbulence Research, *Annual Research Briefs,* 2021.

Gonzalez, C.A., Karp, M., & Moin, P. (2020). "Wall-stress modeling for laminar boundary layers in coarse grids," Center for Turbulence Research, *Annual Research Briefs,* 2020.

SKILLS

Numerical methods, Computational physics, C++, COMSOL, Julia, LaTeX, MATLAB, MPI, CUDA, OpenFOAM, Python, UNIX shell

COMMUNITY OUTREACH

Stanford seeME
I serve as the financial officer and as a teacher for seeME, an outreach program for middle- and high-school students underrepresented in STEM fields. By connecting middle- and high-school students with little or no background in engineering to diverse graduate students who are passionate and eager to teach it, we hope to create meaningful experiences that encourage every participant to explore a potential academic or professional career in engineering.