

**ESTEBAN D. GONZALEZ, Ph.D.**

**EDUCATION**

Ph.D., Mechanical Engineering, University of California at Santa Barbara, 2009.

M.S., Mechanical Engineering, Penn State University, 2005.

B.S., Mechanical Engineering,, Escuela Superior Politecnica del Litoral, 2002.

**RESEARCH INTERESTS**

Computational fluid dynamics (CFD) and heat transfer, combustion, environmental and geophysical fluid dynamics, turbulence modeling, and high-performance scientific computing.

**EXPERIENCE**

**Senior Engineer, Combustion Science and Engineering, Inc., Columbia, MD, 2012-present.**

Analyses and models numerically problems involving combustion, fires and turbulent dispersion.

**Postdoctoral Researcher, Combustion Research Facility, Sandia National Laboratories, 05/2009-12/2011.**

Studied new parameter regimes in various thermo-fluid problems, including stratified shear turbulence, multi-component diffusive convection, and Rayleigh-Taylor mixing.

Obtained engineering correlations for the heat and mass transfer fluxes in these regimes using the following computer codes.

Developed as part of a team codes to model turbulent flows using a new multi-scale strategy based on stochastic numerical simulations.

**Research Assistant, Computational Fluid Dynamics Laboratory, University of California at Santa Barbara, 05/2005-03/2009.**

Analyzed the potential hazard of gravity currents to submarine structures using computational fluid dynamics and simplified mathematical models.

**Research Assistant, Turbulent Combustion Laboratory, Penn State University, 05/2003-04/2005.**

Investigated combustion instabilities using a unique laboratory combustor, which allowed a large range of operating parameters. Developed a simplified model to predict the conditions for these instabilities to occur. These instabilities are potential hazards to gas turbine engines.

## **HONORS AND AWARDS**

National Academies Post-Doctoral Fellowship, 2012 (declined).  
Vanyo Fellowship in Fluid Mechanics, University of California at Santa Barbara, 2009.  
National Science Foundation IGERT Fellowship, University of California at Santa Barbara, 2005.  
Gabron Family Graduate Fellowship in Mechanical Engineering, Penn State University, 2003.

## **PUBLICATIONS**

### **Journal papers**

E. Gonzalez-Juez, A. Kerstein, and D. Lignell. Reactive Rayleigh-Taylor turbulent mixing: a one-dimensional-turbulence study. In preparation.

E. Gonzalez-Juez, R. Schmidt, A. Kerstein. ODTLES simulations of wall-bounded turbulent flows. *Physics of Fluids*, 2011.

E. Gonzalez-Juez, A. Kerstein, and L. Shih. Vertical mixing in homogeneous sheared stratified turbulence: a one-dimensional-turbulence study. *Physics of Fluids*, 2011.

E. Gonzalez-Juez, A. Kerstein, and D. Lignell. Fluxes across double-diffusive interfaces: a one-dimensional-turbulence study. *Journal of Fluid Mechanics*, 2011.

T. Tokyay, G. Constantinescu, E. Gonzalez-Juez, and E. Meiburg. Gravity currents propagating over periodic arrays of blunt obstacles: effect of the obstacle size. *Journal of Fluids and Structures*, 2011.

E. Gonzalez-Juez, E. Meiburg, T. Tokyay, and G. Constantinescu. Gravity current flow past a circular cylinder: Forces, wall shear stresses and implications for scour. *Journal of Fluid Mechanics*, 2010.

E. Gonzalez-Juez and E. Meiburg. Shallow water analysis of gravity current flows past isolated obstacles. *Journal of Fluid Mechanics*, 2009.

E. Gonzalez-Juez, E. Meiburg, and G. Constantinescu. The Interaction of a Gravity Current with a Circular Cylinder Mounted Above a Wall: Effect of the Gap Size. *Journal of Fluids and Structures*, 2009.

E. Gonzalez-Juez, E. Meiburg, and G. Constantinescu. Gravity currents impinging on bottom-mounted square cylinders: Flow fields and associated forces. *Journal of Fluid Mechanics*, 2009.

### **Selected conference papers**

E. Gonzalez-Juez, G. Constantinescu, and E. Meiburg. A Study of the Interaction of a Gravity Current with a Square Cylinder using Two-Dimensional Numerical Simulations. 26th International Conference on Offshore Mechanics and Arctic Engineering, San Diego, California, June 10-15, 2007. OMAE2007-29280.

E. Gonzalez-Juez, J. Lee, and D. A. Santavicca. A Study of Combustion Instabilities Driven by Flame-Vortex Interactions. 41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Tucson, Arizona, July 10-13, 2005. AIAA-2005-4330.

J. Lee, E. Gonzalez, and D. A. Santavicca. On the Applicability of Chemiluminescence to the Estimation of Unsteady Heat-Release During Unstable Combustion in Lean Premixed Combustor. 41st AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Tucson, Arizona, July 10-13, 2005. AIAA-2005-3575.

J. Lee, S. Miller, E. Gonzalez, and D. A. Santavicca. Chemiluminescence Measurements of Overall Heat Release Rates in Lean Premixed Turbulent Flames. 2003 Fall Technical Meeting of the Eastern States Section of the Combustion Institute, University Park, Pennsylvania.

**Selected talks**

E. Gonzalez-Juez, A. Kerstein, and D. Lignell. Fluxes across double-diffusive interfaces: a one-dimensional-turbulence study. 63rd Annual Meeting of the APS Division of Fluid Dynamics, Long Beach, California, November 21-23, 2010.

E. Gonzalez-Juez, E. Meiburg, and G. Constantinescu. Three-dimensional Dynamics of the Gravity Current Flow past a Submerged Cylinder. 61st Annual Meeting of the APS Division of Fluid Dynamics, San Antonio, Texas, November 23-25, 2008.

E. Gonzalez-Juez, E. Meiburg, and G. Constantinescu. The Drag on a Square Cylinder from the Impact of a Gravity Current. 60th Annual Meeting of the APS Division of Fluid Dynamics, Salt Lake City, Utah, November 18-20, 2007.

E. Gonzalez-Juez, E. Meiburg, and G. Constantinescu. Gravity Current - Submarine Structure Interaction: Hazard Analysis via High-Resolution Simulations. 59th Annual Meeting of the APS Division of Fluid Dynamics, Tampa, Florida, November 19-21, 2006.