Exponent®
Engineering & Scientific Consulting

Daniel Jaimes, Ph.D., P.E., CFEI

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Professional Profile

Dr. Jaimes specializes in thermal fluid sciences with an emphasis on high temperature and pressure combustion, alternative fuels, and experimental design. He applies his expertise of fluid and thermodynamic principles to analyze the performance of high-efficiency combustion systems, specifically for a variety of gaseous fuels and at elevated conditions of temperature and pressure.

At Exponent, Dr. Jaimes has conducted origin and cause investigations of structure, vehicle and wildland fires, and has also worked on wildfire litigation cases and insurance claims related to ash/char/soot contamination and thermal/smoke damage. Dr. Jaimes has also investigated the flammable properties of newly developed refrigerants with low global warming potential (GWP) for use in motor vehicle air conditioning systems, as well as matters involving carbon monoxide (CO) poisoning. Additionally, Dr. Jaimes' work experience includes experimentation as well as computational modeling in order to achieve a comprehensive understanding of complex engineering challenges. Dr. Jaimes has conducted a wide variety of laboratory combustion experiments including counterflow flames, constant-volume explosion vessels, high-pressure premixed jet flames, and low calorific fuel injectors. Regarding numerical simulation and computational modeling, his experience includes use of commercial software for chemical kinetic modeling (CHEMKIN), computational fluid dynamics (ANSYS Fluent CFD), and design of experiments (Design-Expert).

Prior to joining Exponent, Dr. Jaimes was a graduate student researcher at the University of California, Irvine (UCI). As part of the UCI Combustion Laboratory and the Advanced Power and Energy Program, he conducted research involving the influence of high temperature and pressure conditions on alternative fuel combustion for stationary power generation systems. His unique research efforts are directly relevant to rapidly expanding industries such as hydrogen combustion and fire safety, as well as fuel cell failure analyses. Dr. Jaimes developed a standardized test rig for the experimental determination of the lower flammability limits (LFLs) for various renewable fuels at elevated temperature and pressure conditions. His doctoral work involved a computational approach for investigating novel combustion challenges associated with a solid oxide fuel cell (SOFC) gas turbine (GT) hybrid power system operating on a variety of gaseous fuels. In addition to his academic and research exploits, Dr. Jaimes was also active in outreach activities to engage current graduate students in professional development workshops as well as to recruit and prepare undergraduate students for graduate school careers.

Academic Credentials & Professional Honors

Ph.D., Mechanical and Aerospace Engineering, University of California, Irvine, 2020

M.S., Mechanical and Aerospace Engineering, University of California, Irvine, 2017

B.S., Aerospace Engineering, University of California, Irvine, 2013

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B.S., Mechanical Engineering, University of California, Irvine, 2013

2019-2020 President's Dissertation Year Fellowship, UC Irvine

2017-2018 Faculty Mentor Program (FMP) Diversity Fellowship, UC Irvine

2016-2017 Engineering Student Council Mechanical and Aerospace Engineering (MAE) Graduate Student of the Year Award, UC Irvine

Licenses and Certifications

Professional Engineer Mechanical, California, #40912

Certified Forklift Operator (CFO)

Certified Fire and Explosion Investigator (CFEI) (CA)

40-Hour Hazardous Waste Operation and Emergency Response Certification (HAZWOPER)

Fire Investigation 1A (Cause and Origin), California Office of State Fire Marshal

Professional Affiliations

[2024 – Present] Alternate Member: Technical Committee on Industrial and Medical Gases, NFPA 55 Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, National Fire Protection Association

[2020 – Present] Active Member: American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), National Association of Fire Investigators (NAFI), The Combustion Institute, American Society of Mechanical Engineers (ASME)

Languages

Spanish

Publications

Kytömaa H, Wechsung A, Dimitrakopoulos G, Cook N, Jaimes D, Hur IY, Faraji S. Industry R&D Needs in Hydrogen Safety. Applications in Energy and Combustion Science. 2024 May 10:100271.

Jaimes D, McDonell VG, Samuelsen GS. Numerical investigation of a dual-stage off-gas burner to support high pressure and high temperature solid oxide fuel cell/gas turbine (SOFC/GT) hybrid systems. Cleaner Engineering and Technology 2021; p.100321.

Jaimes D, McDonell VG, Samuelsen GS. Lean Flammability Limits of Syngas/Air Mixtures at Elevated Temperatures and Pressures. Energy & Fuels 2018; 32, 10, 10964-10973.

Jaimes D, McDonell VG, Samuelsen GS. Experimental Determination of Lean Flammability Limits of Renewable and Process Gas Mixtures at Elevated Temperature and Pressure Conditions. Proceedings of the ASME Turbo Expo 2018: Turbomachinery Technical Conference and Exposition. Volume 4A: Combustion, Fuels, and Emissions. Oslo, Norway. June 11-15, 2018. V04AT04A003. ASME.

Presentations

Jaimes D, Jokar A. New developments on investigating the ignition propensity of mildly-flammable refrigerants. Proceedings, ASHRAE Annual Conference, art no. IN-24-C032, Indianapolis, IN, 2024.

Rundel J, Manzano Miura N, Welchert N, Jaimes D, Christiansen EW. Investigating the Ignition Propensity of Forest Fuels by Molten Copper and Aluminum Droplets. Seventh International Fire Behavior and Fuels Conference, Boise, Idaho, USA, April 2024.

Kytomaa H, Wechsung A, Dimitrakopoulos G, Cook N, Jaimes D, Hur IY, Faraji S. Perspective Paper to Be Submitted to 40th International Symposium on Combustion, Milan, 21-26 July 2024.

Xiouris C, Jaimes D, Christiansen EW. Forest Fuel Moisture and Size Effects on the Ignition Propensity of Wildland Fires by Hot Metal Fragments. Proceedings, Fire and Climate Conference by the International Association of Wildland Fire, Pasadena, CA, May 2022.

Jaimes D, McDonell VG, Samuelsen GS. Exploring the Distributed Reaction Regime for modeling non-catalytic partial oxidation of renewable fuels at elevated pressures. 11th US National Combustion Meeting, Pasadena, CA, March 2019.

Jaimes D, McDonell VG. Lean flammability limits of renewable gas mixtures at elevated temperatures and pressures. 10th US National Combustion Meeting, University of Maryland, College Park, MD, April 2017.

Jaimes D, McDonell VG. Determination of lower flammability limits of renewable gas mixtures at elevated temperatures and pressures. Western States Section of the Combustion Institute (WSSCI) Spring Meeting, Seattle, WA, March 2016.

Peer Reviews

Energy & Fuels

Combustion Science and Technology

ASME Turbomachinery Technical Conference and Exposition

ACS Omega

International Society of Ocean and Polar Engineers