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Fernando Soria, Ph.D.

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Professional Profile

Dr. Fernando Soria is a mechanical engineer specializing in thermal-fluid systems, with expertise in experimental heat transfer, electronics cooling, and system-level thermal management. He has led multidisciplinary projects involving high-pressure spray cooling systems for industrial and high-power electronics applications, such as thermal management in data centers, steelmaking equipment, and thermal spray coating processes. Dr. Soria has experience in the design and failure analysis of thermal systems, integrating data acquisition, control systems, and transient thermal modeling to diagnose and resolve performance issues. His work focuses on solving complex engineering problems through innovative design, experimental validation, and clear, actionable insights, and he brings a collaborative, results-oriented approach to addressing diverse challenges.

As part of his doctoral work, Dr. Soria designed and constructed a high-pressure experimental testbed equipped with feedback-controlled heating elements and spray nozzles, along with high-precision thermocouples for detailed thermal measurements. He developed a comprehensive model to predict droplet geometry and evaporation-driven mass flux, which was then used to estimate the heat flux removed by individual droplets. These results were extended to include the statistical nature of the droplet size distribution in a real spray.

In addition to his research background, Dr. Soria has industry experience in the testing and evaluation of architectural window systems. He performed structural testing and analytical comparison using beam models in accordance with AAMA standards, as well as air and water infiltration testing to assess enclosure integrity. His work also included steady-state thermal analysis to evaluate energy performance and sound transmission class (STC) testing to quantify acoustic insulation. Through this work, Dr. Soria gained hands-on experience with standardized testing protocols, precision instrumentation, and performance benchmarking, contributing to both product validation and design optimization efforts.

Dr. Soria is proficient in designing and constructing experimental setups for high-pressure two-phase flow and heat transfer studies, including spray cooling systems used in applications ranging from electronics cooling and data center thermal regulation to metallurgical process control and advanced coating technologies. He has experience troubleshooting complex instrumentation systems, performing leak testing, and implementing safety protocols for high-temperature and pressurized environments. His technical skill set includes custom data acquisition and control programming, PID tuning, and thermal system calibration. He is also experienced with advanced diagnostic techniques such as interferometry for thin film characterization, high-speed videography, infrared thermography, transient heat flux estimation, pressure and flow measurement, and profilometry for surface analysis.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of Central Florida, 2024

B.S., Mechanical Engineering, Escuela Superior Politecnica del Litoral, 2017

Prior Experience

Graduate Research Assistant, University of Central Florida, 2020 – 2025

Technical Support Engineer, United Window & Door Mfg, 2018 – 2019

Publications

Soria F, Woodruff E, Fordon AG, Xu Y, Putnam SA. Multiscale modeling of microdroplet evaporation and single pulse spray cooling. Fluid Dynamics Research 2025. https://doi.org/10.1088/1873-7005/adc2cd

Fordon AG, Soria F, Woodruff E, Brewer C, Xu Y, Putnam SA. Multi-nozzle, common-rail-based, piezo-actuated, pulsed spray cooling testbed. International Journal of Heat and Mass Transfer 2025. https://doi.org/10.1016/j.ijheatmasstransfer.2024.126596

Fordon AG, Soria F, Xu Y, Putnam SA. Recurrent neural network flow rate modeling of piezoelectric injectors in cooling testbeds. Journal of Thermophysics and Heat Transfer 2023. https://doi.org/10.2514/1.T6833

Presentations

Soria F, Woodruff E, Fordon AG, Putnam SA, Xu Y. An experimental study on high-pressure pulsed sprays for efficient management of high heat fluxes for moderate area devices. Conference presentation, IEEE iTherm, Orlando, FL, 2023.

Soria F, Gordon A, Xu Y, Putnam SA. Thin film surface reconstruction from interferometry curvature measurements. Conference presentation, IEEE RAPID, Miramar Beach, FL, 2022.