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The CIVE 6111 Graduate Seminar Series

Convection: from small plumes to large coherent turbulent structures

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2:45PM-3:45PM
Classroom Business Building (CBB) Room 108

Abstract

In this talk, I will describe the efforts made through the years to numerically study two canonical problems of convection: Rayleigh-Benard convection, a fluid heated from below and cooled from above, and the Taylor-Couette flow, the flow between two co-axial cylinders rotating independently. At high Reynolds numbers, these flows generate small-scale plumes which aggregate to form large-scale turbulent coherent structures. These structures have relevance in many applications. Their modelling and control is essential for understanding many physical processes such as electro-osmosis, continental drift through the Earth's mantle as well as in photochemical bio-reactors. After this, using what we learned throughout the years, we will show variations on the basic problem we are currently studying for engineering and architectural applications, such as windcatchers and wastewater quality detection.

Bio

Rodolfo Ostilla Mónico is an assistant professor at the University of Houston in the department of Mechanical Engineering since Fall 2017. He obtained his bachelor degree in Aerospace Engineering from the University of Sevilla (Spain) and an MSc in Aerospace Dynamics from Cranfield University (UK). His PhD thesis was obtained at the University of Twente in the Netherlands, under the supervision of Roberto Verzicco and Detlef Lohse. From there, he moved to Harvard University for a postdoc under Michael Brenner. His research focuses on computational fluid mechanics at high Reynolds numbers from the fundamental to the applied.