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Gas bubble dynamics: a personal journey

Professor Roberto Zenit

Brown University

Date: Tuesday, September 12, 2023 14:00-15:00

Venue: Faculty of Engineering Bldg. 2, 3F Room31A

Abstract: The study of the dynamics of gas bubbles in liquids is justified by the numerous applications and natural phenomena where this two-phase flow is encountered. Gas bubbles move as forces are applied to them ; their dynamics are full of nuances that need to be addressed carefully. Since the mass of gas bubbles is practically negligible, in comparison with that of the surrounding liquid, their reaction to forces can be drastic. Furthermore, since their surface can be deformed by the same forces acting on them, their shape may change leading to changes in their resistance to move, the drag force, and therefore affecting their speed. The liquid rheology, as well as its surfactant content can also affect the bubble shape and motion as well. Understanding these issues, in addition to the effect of interactions with other bubbles, walls and non-uniform flows, provides sufficient elements to model and predict bubble behavior through the solution of dynamics equations. In this talk, I will discuss some of these issues which have kept me busy for the past 20 years, to end with suggestions for research directions for the subject in the future.

Short bio: Roberto Zenit received his Ph.D. from the Mechanical Engineering Department at Caltech in 1998. After a postdoctoral period at Cornell University, he moved to Mexico City in 2000 to become a faculty member at the Universidad Nacional Autónoma de México (UNAM), eventually becoming a Full Professor of Mechanical Engineering and a researcher at the Instituto de Investigaciones en Materiales, both at UNAM. He is now a Professor of Engineering at Brown University. He is a fellow of the APS, a member of the Mexican Academy of Sciences and the Academy of Engineering of Mexico. His area of expertise is fluid mechanics; he has worked in a wide variety of subjects including multiphase and granular flows, biological flows, rheology, and more recently, the physics of artistic painting.

主催：
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