UNIVERSITY OF DELAWARE

CENTER FOR NEUTRON SCIENCE

UNIVERSITY OF DELAWARE
ENGINEERING

TUESDAY | OCT 17 | 4:00 PM | 366 CLB

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FROM THE MOLECULAR PHYSICS IN NON-EUCLIDEAN SPACES TO THE NON-EQUILIBRIUM STATISTICAL THERMODYNAMICS

BIO:

Graduate in Physics from the Universidad Veracruzana (1998) in Mexico. Master and Doctor of Sciences with a specialty in Physics from the Center of Research and Advanced Studies in Mexico (2003). Postdoctoral stay at the Department of Physics at the University of Konstanz in Germany (2003 – 2004). Since 2005, Full Professor of the Division of Sciences and Engineering (formerly the Institute of Physics) of the University of Guanajuato (Mexico). To date, he has supervised 52 theses (including 27 doctoral ones) and has published 99 research articles that have generated more than 2000 independent citations; h = 28. He has 1 National Patent and 1 Technology Transfer. Editor of two international journals.

ABSTRACT:

The physical properties of the so-called “self-assembling materials” (proteins, colloids, polymers, membranes, Janus particles, etc.) not only depend on the interaction between their constituents and thermodynamic constraints, but also on the geometry of the space in which they are embedded, the nature of the external field (in case they are subjected to its action) and the preparation “protocol”. As a result, these materials exhibit interesting and diverse structural, thermodynamic and transport properties that provide them with unique characteristics that are of interest to basic science and, of course, technological development and innovation. In this talk, I will talk about the scientific contributions that we have made in recent years to understand some of the self-organization (spontaneous and directed), thermodynamic and molecular transport processes of some self-assembling materials. We will put special emphasis on the effects of geometry and on those situations that lead this class of materials to states of matter out of thermodynamic equilibrium.