THE GEORGE WASHINGTON UNIVERSITY
DEPARTMENT OF PHYSICS
COLLOQUIUM

TIME: 4:15 p.m., Thursday, March 14, 2002
PLACE: 101 Corcoran Hall, GWU
725 21st Street, N.W.
(Between G and H Streets)
METRO STATION: GWU/FOGGY BOTTOM (BLUE & ORANGE LINES)

Helim Aranda-Espinoza
University of Pennsylvania

"The Mechanical Properties of Membranes and Biopolymers"

Two of the most prominent and important structures in cells are the cytoskeleton and the biomembrane. The cytoskeleton gives stability to the cell and helps organize its contents. The primary tasks of biomembranes are to enclose the cell and its organelles and to mediate the interactions between the elements it encloses and its surroundings. In order to carry out their functions, the cytoskeleton and the biomembrane have specific and well-regulated mechanical properties, which are not yet well understood (mainly due to the high complexity of living systems). However, simpler models that give insight into the most complex systems can be studied. Two such systems are explored here: First, the study of the mechanical properties of synthetic membranes is accomplished through a combination of micropipette aspiration and electroporation techniques. In particular, the electromechanical properties of membranes as a function of the hydrophobic thickness are explored. As expected, it is found that the thicker the membrane, the higher its stability. Secondly, one of the components of the neuronal cytoskeleton - neurofilaments - is studied. Of particular interest in this polymeric component are the mechanical properties of their small protrusions, called sidearms. Sidearms are believed to be responsible for the axon caliber. Thus, their structure and mechanical properties are studied by dynamic light scattering, circular dichroism, and atomic force microscopy to explore the possible mechanisms by which the sidearms control the axon caliber. It is found that the structure and strength of the sidearm depends on its degree of phosphorylation.

REFRESHMENTS AT 3:45 P.M.