

# COLUMBIA UNIVERSITY

IN THE CITY OF NEW YORK

DEPARTMENT OF BIOLOGICAL SCIENCES

Biocomplexity Faculty Search Committee,  
c / o Prof. Rob de Ruyter van Steveninck,  
Department of Physics,  
Indiana University,  
Swain Hall West 117,  
Bloomington IN, 47405-7105

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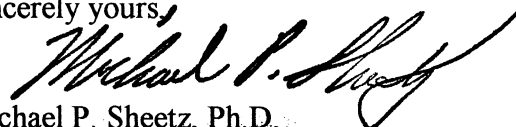
Dear Search Committee,

I have the highest regard for Dr. Arpita Upadhyaya. She is one of the brightest young scientists working at the interface of Physics and Biology. She came to my lab at the MBL in Woods Hole during the summer of 1996 to do a couple experiments, which became the basis for a major paper. Her study addressed the important problem of how does the Golgi membrane move rapidly into the endoplasmic reticulum after treatment with brefeldin A. In brief, she determined that membrane tension in the endoplasmic reticulum was much greater than tension in the Golgi. Thus, membrane would be physically pulled from the Golgi into the endoplasmic reticulum if they were to fuse. She further showed that homologous fusion was common (i.e., Golgi strand to Golgi strand) but that heterologous fusion of Golgi strands to endoplasmic reticulum did not occur even with the aid of laser tweezers. These are demanding experiments that take knowledge and skill in both physics and biology, which is found in a few rare individuals.

Her work as a postdoc has provided important insights into several basic questions in cellular mechanics. In the case of the measurement of the force generated by actin polymerization, she found that the forces were in the range of nanonewtons from the deformation of lipid vesicles. In Vorticella, she has characterized the molecular spring that responds to calcium by contracting rapidly in a manner that is indeed inconsistent with an elastic spring.

She will make important contributions in the future because she has an unusual background and the drive to work at the interface of physics and biology. I rank her with the top group of Postdocs who have worked with me and those include Professors at Johns Hopkins, Univ. of Bourdeaux and Brandeis.

Sincerely yours,



Michael P. Sheetz, Ph.D.  
William R. Kenan, Jr. Professor of  
Cell Biology and Chair