

# “Engineering Pathways Across Biological Barriers”

**Virtual Seminar  
Wednesday  
October 21, 2020  
3:00 pm**



**Shikha Nangia**  
Associate Professor  
Biomedical and Chemical Engineering  
Syracuse University

## **Abstract**

Engineering pathways across biological barriers is entering a new era with the rapid advancement of computational resources. My research group focuses on developing multiscale simulation methods to elucidate the interfacial phenomena associated with biological barriers that play a role in life-threatening diseases, such as Alzheimer's, cancer, and chronic infections. Our goal is to influence this experimentally-dominated research field by providing mechanistic, structural, and molecular insights into the barrier functions that were computationally unattainable prior to our work. In past few years, we have made breakthroughs in three research domains: elucidated the molecular architecture of the blood-brain barrier and developed strategies to enhance the barrier's permeability for treatment of the neurodegenerative diseases; developed telodendrimer-based nanocarriers for efficient delivery of approved anticancer drugs for treatment of solid tumors; and designed an online computational platform to screen libraries of small molecules for their permeability across bacterial membranes, and determine their use as antibiotics for treatment of chronic infections. All three research domains have ties with experimental groups to ensure the validity of our research findings. In my talk, I will elaborate on our computational methods, present the key results, and provide a perspective on the long-term research goals of the group.

## **Bio**

Shikha Nangia, Ph.D. is an Associate Professor in the Department of Biomedical and Chemical Engineering at Syracuse University. Dr. Nangia received her Ph.D. in Chemistry from the University of Minnesota, Twin Cities, in 2006, and completed her postdoctoral training at Pennsylvania State University. Dr. Nangia's research focuses on using computational approaches to overcome biological barriers and to enhance drug delivery. Her research projects include exploring treatments for Alzheimer's and Parkinson's diseases, cancer, and epigenetics. Her recent focus has been to examine the architecture of the blood-brain barrier with the aim to identify novel strategies to facilitate the transport of drug molecules into the brain. Using innovative computational approaches, Dr. Nangia's research has received substantial funding to date. Dr. Nangia has also received numerous honors and awards for her research and teaching throughout her career, and she was most recently awarded for her outstanding contribution to student experience and university initiatives at Syracuse University.

**Fall 2020 CBE Seminar Series**

