



## “It’s all about the Interface: Neutron Scattering Insights into Polymer Nanocomposites”

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**Bio:** Rana Ashkar is an assistant professor of Physics at Virginia Tech. Prior to her current appointment, she held a Clifford G. Shull Fellowship at Oak Ridge National Laboratory, preceded by a joint postdoctoral scholarship at NIST and the University of Maryland at College Park. Prof. Ashkar completed her graduate studies at Indiana University and was the recipient of the university-wide 2013 Esther L. Kinsley doctoral dissertation award. Her research focuses on nanoscale structures and dynamics in soft matter, with specific emphasis on polymeric systems and biomimetic lipid membranes. Among the many approaches that she uses in her research, she is particularly interested in the applications of x-ray and neutron scattering techniques to resolve nanoscale and collective molecular structures/motions that are critical to the technological and biological applications of soft materials. Beside her scholarly achievements, Prof. Ashkar is committed to diversity and inclusion in STEM fields and has been an active member on several committees promoting a better environment for minorities in sciences. She was the founder and first chairperson of the “Women in Neutrons Sciences” committee at Oak Ridge National Lab and is currently the chair of the site visits subcommittee of the APS Committee on the Status of Women in Physics.

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## Prof. Rana Ashkar



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**Abstract:** Nanoparticle-polymer hybrids and composites are central to a wide range of advanced multifunctional materials and technological applications. The premise of such systems lies in the myriad of possibilities that they offer in synergistically integrating particle and polymer properties to obtain significantly improved material performance. The past few decades of research on nanoparticle-based materials have remarkably enhanced our understanding of their macroscopic behavior and have resulted in an array of novel technologies. Yet, the demand for increasingly sophisticated applications of nanoparticle-polymer composites requires design rules that allow control of nanoscale interactions between the nanoparticles and their host environment. Such interactions manifest in unique interfacial structural and dynamical properties which ultimately determine the emergent material behavior. In this talk, I will highlight the role of neutron scattering in directly observing and resolving interfacial properties that are critical to the design and performance of nanoparticle-polymer hybrids and composites.

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