

CNM WK2: Current Trends and Opportunities in Nanobiointerface Materials

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Nanoscale phenomena in biology demonstrate some of the most carefully orchestrated energetic processes. At the Center for Nanoscale Materials, we are inspired by these natural systems and employ them in hierarchically assembled materials to either exploit natural function or generate new functions altogether. The Department of Energy has expressed great interest in several topics where scientists have called upon biomolecular systems to address the demands. In particular, investigations in quantum phenomena, microelectronics, and artificial intelligence are high on the radar. In this workshop, we plan to highlight all that nature has to offer when investigating these topics. Whether studying natural systems, interfacing materials with biology, or designing biomolecular materials nanoscale properties emerge that provide exciting avenues to explore in each of these topical areas. Quantum phenomena are observed in arrays of materials and their properties are investigated using advanced spectroscopies and methodologies. Development of novel materials and devices represents an area that focuses on optimizing material performance and interface capabilities for optimal sensing performance. Flexible electronics have shown exceptional promise in wireless medical sensing and diagnostics. Exploring the development of highly efficient flexible organic materials is essential for the advancement of the field. And finally employing artificial intelligence in sequence identification of novel biomolecular assemblies marks the future of molecular design. Essential to AI development are modernizing laboratories with automation and the production of standardized and searchable biomaterials databases. The goal of this workshop is to inform the user community of trends as well as determine avenues in which the DOE funded Scientific User Facilities can assist the broader scientific community in achieving their nanobiointerface goals.