The Center for Dynamics and Control of Materials: an NSF MRSEC at UT Austin

Edward T. Yu
The University of Texas at Austin

The Center for Dynamics and Control of Materials (CDCM), an NSF MRSEC, was launched in September 2017 and pursues research directed broadly towards achieving a deeper understanding of, and control over, dynamical, nonequilibrium behavior and reconfigurability of materials across multiple spatial and temporal scales. CDCM research activities are organized primarily into two Interdisciplinary Research Groups. The first, titled Reconfigurable Porous Nanoparticle Networks, addresses multifunctional, reconfigurable networks of nanoparticles, polymers, and organic molecules that respond to a range of external stimuli. Fundamental principles are elucidated for understanding and controlling the assembly and reconfiguration of nanoparticles connected by molecular linkers, with theoretical and experimental efforts combining to create unique optical, chemical, or biological materials functionality. The second, titled Materials Driven By Light, addresses light-matter interactions that lead to material properties not accessible in equilibrium. Phases and ordered states accessed via light-induced perturbations to energy landscapes, topological material behavior enabled by optical excitation, and formation of exotic quantum phases are explored to provide new understanding of and control over optically responsive materials. These and related research efforts are integrated with extensive initiatives in education, outreach, and promotion of diversity. We will present an overview of the Center's activities, accomplishments, and directions in research, education, outreach, and inclusion.

Biosketch: Edward T. Yu is Professor of Electrical Engineering and holds the Judson S. Swearingen Regents Chair in Engineering at the University of Texas at Austin. He currently serves as the founding Director of the Center for Dynamics and Control of Materials: an NSF MRSEC. He received his A.B. (summa cum laude) and A.M. degrees in Physics from Harvard University in 1986, and his Ph.D. degree in Applied Physics from the California Institute of Technology in 1991. Prior to joining the University of Texas at Austin, he served as a faculty member in Electrical and Computer Engineering at the University of California, San Diego for seventeen years. Professor Yu has been the recipient of an NSF CAREER Award, an ONR Young Investigator Award, an Alfred P. Sloan Research Fellowship, and the UCSD ECE Graduate Teaching Award, and is a Fellow of AVS and IEEE. He is an alumnus of the 2000-01 Defense Sciences Study Group (DSSG), and served as a member (2005-16) and Chair (2012-14) of the DARPA Defense Sciences Research Council (DSRC). Current research interests in his group include photovoltaics and other technologies for energy generation; scanning probe characterization of advanced electronic materials and devices; and solid-state nanoscience and nanotechnology generally.