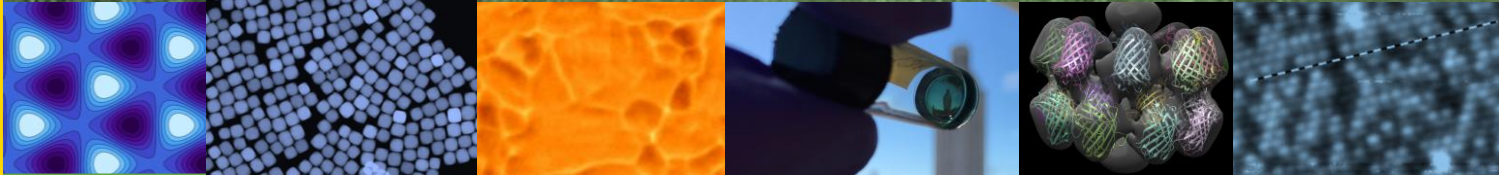




# Exploring the design, creation, fundamental understanding, and control of materials through transdisciplinary research, education, and outreach



The University of Texas at Austin

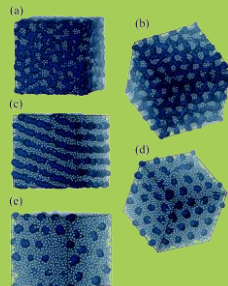


The Center for Dynamics and Control of Materials seeks to extend the traditional paradigm of materials research beyond the study of behavior in or near equilibrium to encompass the understanding and control of materials over extended temporal and spatial scales.

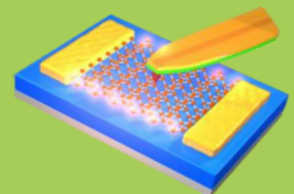
The Center supports collaborative, interdisciplinary research on nanocomposite materials that combine inorganic and organic components, with applications in energy storage and filtration membranes, and on approaches for exploiting light to achieve dynamic, quantum control of materials for communications and information processing.

Twenty four senior investigators from eight academic departments at the University of Texas at Austin and Rice University, together with collaborators at national and international laboratories, work together to advance fundamental materials science that addresses the technological, economic, and educational needs of society.

## HIGHLIGHTS...



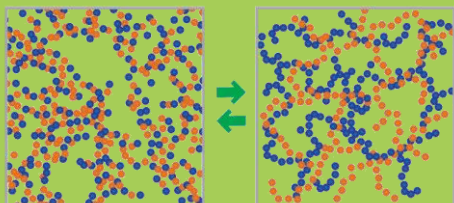
IRG 1: Engineering particle interactions in nanocomposite materials enables realization of dramatically different morphologies.



IRG 2: Microwave impedance microscopy enables characterization of electrical conductivity in advanced transistors at the nanoscale.

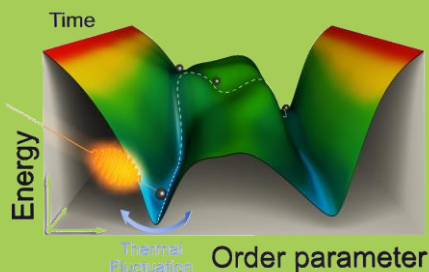
DIRECTOR: Edward T. Yu  
<https://mrsec.utexas.edu>

## RESEARCH FUNDAMENTALS...



**IRG 1, Reconfigurable Porous Nanoparticle Networks**, addresses multifunctional, reconfigurable networks of nanoparticles, polymers, and organic molecules that respond to a range of external stimuli. Controlled assembly and reconfiguration of nanoparticles connected by molecular linkers enables unique optical, chemical, or biological materials functionality.

**IRG 2, 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.



“By closely integrating research, education, and outreach, we can benefit society by unleashing the potential of new materials to advance technology, educating new generations of scientists, and informing the public at large.”

Edward T. Yu, Director  
CDCM



## EDUCATION, OUTREACH, AND BROADENING PARTICIPATION...

CDCM integrates interdisciplinary materials research with extensive initiatives in education, outreach, and the promotion of diversity. Specific programs include:

**REU – Research Experience for Undergraduates:** engaging students in an interdisciplinary summer research experience with graduate student and faculty mentors.

**RET – Research Experience for Teachers:** providing elementary and secondary school teachers with summer research experiences, tools, and ongoing relationships to help them inspire young learners in science and engineering.

**Arts+Sciences:** bringing together artists and materials researchers to engage new audiences in the excitement, beauty, and impact of materials science and technologies.

**Stuff:** exposing K-12 students, teachers, and parents to materials science, discovery, and innovation.

**Entrepreneurial Greenhouse:** connecting materials researchers with the startup community and the entrepreneurial experience.

**Industry/University Nexus:** preparing students for professional success in a diversity of career paths.

# OUTREACH

More information about education, outreach, and promotion of diversity at CDCM is available at:  
<https://mrsec.utexas.edu/education-outreach>



Center for Dynamics and  
Control of Materials:  
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