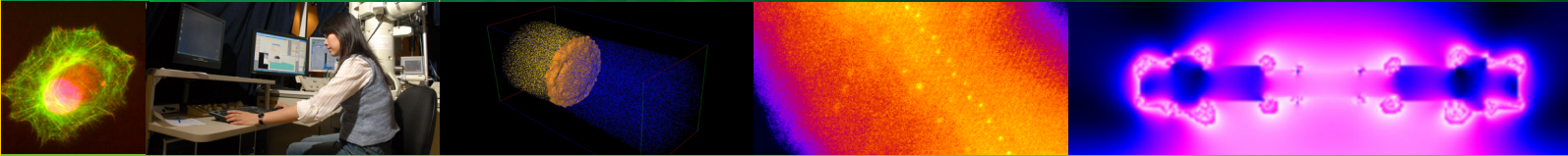


NU

Combining Theory, Modeling and Experimentation to Understand Multifunctional Nanoscale Materials to Solve Tomorrow's Challenges

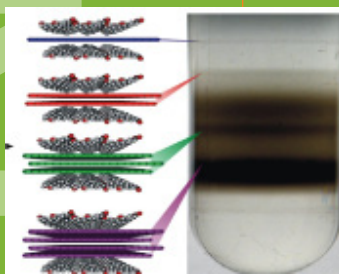


The vision of the NU-MRSEC is to create and develop programs in research, education and outreach that transform society.

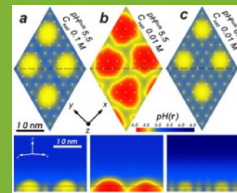
The shared mission of the Center is to explore fundamental scientific properties and potential technological applications of multifunctional nanoscale material structures. Guided by advanced computational methods and simulation, the NU-MRSEC uses its expertise in nanotechnology and innovative processing techniques to design, synthesize, and understand new materials that can be applied to environment and infrastructure improvement and to solutions for problems ranging from energy efficiency to information processing. NU-MRSEC research teams have

advanced atomic-scale understanding of optical transparency and conductivity in new classes of transparent conducting oxides for use in solar cells and electronic devices, studied the balance of chemical and physical interactions that lead to the emergence of molecular organization and function in cells, learned to manipulate light on the nanometer length scale by designing and combining particle shapes and substrates, and developed semiconductors and dielectrics that will enable the production of flexible, optically transparent circuitry.

HIGHLIGHTS . . .

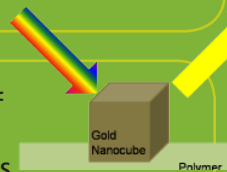


Superior performance in electronic devices results with 99% pure carbon nanotubes and monodisperse graphene flakes.

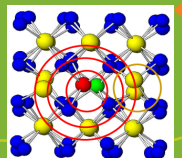


Investigating nano-scale self-assembly provides guidelines for the design of intelligent sensors.

Correlation of the structure and properties of single nano-particles provides the basis for a new generation of devices.



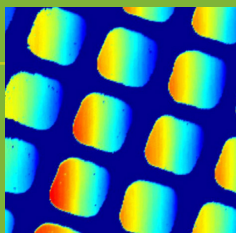
Understanding structure-property relationships in transparent conducting oxides enables new display technologies and improved solar cells.



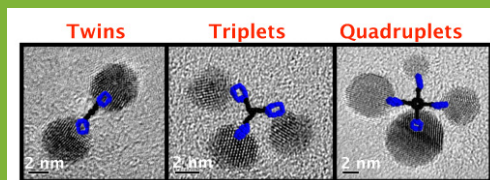
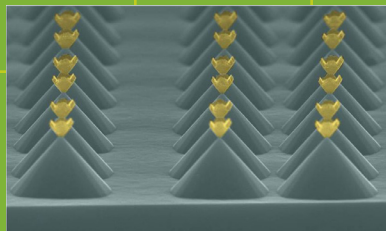
DIRECTOR: Monica Olvera de la Cruz
<http://www.mrsec.northwestern.edu/>

RESEARCH FUNDAMENTALS . . .

Developing energy-efficient novel devices for information technology.



Advancing the understanding of molecular plasmonics at the single nanoparticle and single molecule levels.



Investigating the design and organization of functional assemblies involving polyvalent nanoparticles and macromolecules.

By combining synthesis, characterization and theory, we design and fabricate functional nano-scale materials with unique photonic, electrical and mechanical properties important for the advancement of our nation's science and technology. //

Monica Olvera de la Cruz,
Director
NU-MRSEC



MRSEC OFFERS DIVERSE EDUCATION AND PARTNERSHIPS...

- **ETOPiA (Engineering Transdisciplinary Outreach Project in the Arts)** offers a science-themed play which encourages community dialogue about the importance of science.
- Graduate students in the **Science Speakers Corp** present short research talks at high schools and community colleges, inviting students to consider graduate work in science and engineering.
- **REU and RET (Research Experience for Undergraduates and Teachers)** participants spend a summer conducting nanomaterials research and developing scientific writing and presentation skills.
- A collaboration with the **Art Institute of Chicago** on research advances the use of scientific tools to examine art, and hosts symposia which bring together an international community of scientists and curators.

OUTREACH

More information about the workshops, internships, partnerships, and educational opportunities are available at:
http://www.mrsec.northwestern.edu/content/educational_programs/index.htm

