

A Tradition of Excellence in Multidisciplinary Research and Education on Polymers at the Frontiers of Materials Research

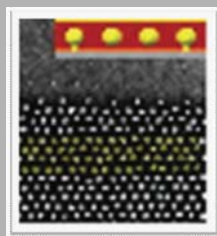


The UMass MRSEC supports, promotes, and produces state-of-the-art research and education in polymeric materials, which are key fundamental building blocks used in society.

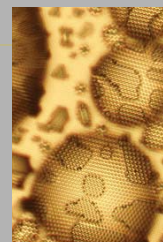
A rich array of interdisciplinary research, education, and outreach programs are united in the single goal of solving complex problems in materials research. Endeavors impact the K-12, undergraduate, graduate and postdoctoral levels, while educating and inspiring scientific researchers, and influencing our global society through worldwide collaborations from academic, industrial and national laboratories as well as industrial licensing of developed technologies. Our Center's multidisciplinary nature is evident from the diverse spectrum of disciplines represented by its researchers, ranging from polymers and materials science, chemistry,

chemical engineering, mechanical engineering, and theory. This sweeping breadth of expertise positions the Center to address unique problems in polymer materials that mandate an interdisciplinary approach to problem solving and ensures an environment well-suited to educating and stimulating students at the forefront of materials science and engineering. The Center's dedication to enhance diversity among researchers and educators builds an integrated pipeline for students, leading to careers in science, technology, and engineering, and mathematics, ensuring the future success of the program.

HIGHLIGHTS ...



State-of-the-art fabrication methods were developed on nanoscale patterned surfaces to extend electronic storage media to micron-level high densities.



Center investigators collaborate with industrial partners to study the condensation of water on ultrahydrophobic surfaces containing silicon pillars.

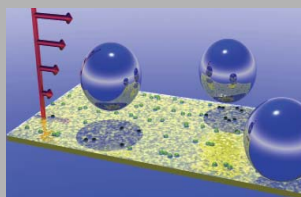
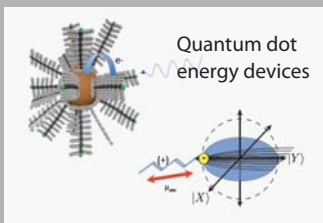
DIRECTOR: Todd Emrick
<http://www.pse.umass.edu/mrsec>

POLYMERS

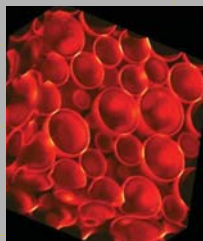
MATERIALS RESEARCH SCIENCE AND ENGINEERING CENTER ON POLYMERS

RESEARCH HIGHLIGHTS . . .

Electronic coupling between nanostructured inorganic (quantum dot) and organic (polymeric) semiconducting materials is critically important in the realization of efficient novel light-energy harvesting devices.



Researchers created nanoparticle-containing surfaces that direct the dynamic adhesion of micron scale objects



Polymer and nanoparticle-covered droplets function as encapsulation and controlled release devices.

“Polymers are central to materials research and interdisciplinary efforts on polymers are yielding unprecedented control over macromolecular structure and function.”

Todd Emrick, Director
UMass MRSEC on polymers



UMASS MRSEC OFFERS DIVERSE EDUCATION AND PARTNERSHIPS . . .

GRADUATE LED PROGRAMS

- Polymers All Around Us - K-12 Interactive Experience
- ASPIRE - High School Hands-on Research and Education Program

RESEARCH EXPERIENCES

- REU - Research Experience for Undergraduates: Undergraduates join a MRSEC supported research group for a ten-week period during the summer, working in a graduate-level environment on fundamental research problems.
- RET- Research Experiences for Teachers: Participants perform research as a team on topics in nanotechnology, biotechnology and polymer science, then develop teaching modules to transfer their experience to their classroom.
- ARCH -Advancing Research and Collaboration

with High Schools: Students perform research under the guidance of a collaborating faculty member, graduate student and high school teacher and attend seminars presented by world-renowned scientists

INTEGRATING ART AND SCIENCE

- VISUAL-Ventures In Science Using Art Laboratory: Captivating images of MRSEC-supported research are displayed as an effective means to educate and stimulate the general public, as well as students of all ages, on the importance and imagery of scientific research in our everyday lives.
- Polymerge- Students utilize images from the MRSEC research to appreciate the connection between art and science to promote creative thinking.

OUTREACH

Information about our workshops, internships, partnerships, and educational opportunities are available at <http://www.pse.umass.edu/mrsec/outreach>

