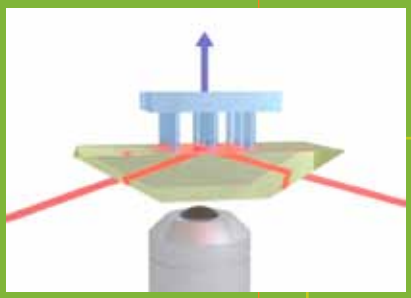
Science at the Interface

Harvard MICROFLUIDICS

The Harvard MRSEC focuses on soft materials, microfluidics and active soft materials and has maintained its focus on biomaterials through a seed initiative.

It also has a seed project in energy-related catalysis. The most important impact of the Harvard MRSEC is through the intellectual rigor and training the Center provides to our students and postdoctoral fellows, who become the next generation of leaders among the scientists and engineers in both our nation, and across the world. The Center has extensive outreach to schools and museums to help educate the public about materials research. The MRSEC supports public-interest lectures reaching out to members of the local community and highly-visible programming for the broader national community. The Center interacts broadly with industry, both to provide important new intellectual challenges and to provide future employment opportunities for students and postdoctoral fellows. The Harvard MRSEC directly creates new high-quality jobs through the start-up companies that come from the Center's research. These spin-out companies reflect the core values of the Center which inspires innovation and risk taking.



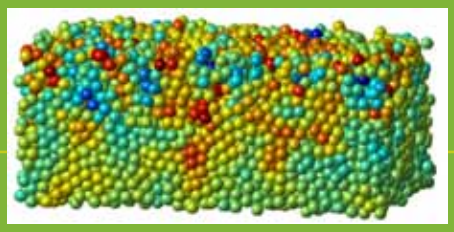
HIGHLIGHTS . . .

Investigation of the microdynamics of adhesive failure provides new insights into behavior of everyday mechanisms from the performance of duct tape to the tearing of ligaments from bone during trauma.

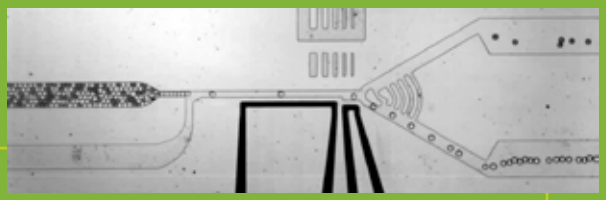
By using flexible, soft robotic tools, we have developed a general methodology, based on embedded pneumatic networks, enabling actuation of large soft elastomers, to create a universal gripper, shown here lifting an orange.

DIRECTOR: David A. Weitz
http://www.mrsec.harvard.edu

RESEARCH FUNDAMENTALS . . .



Fundamental studies of the nature of the amorphous state from direct microscopic observation of colloidal particles.



Ultra high-throughput screening and selection for rapid development of new materials using Nature's way, through 'directed' evolution, using drop-based microfluidics.

Address materials challenges in flexible electronics through unique combination of microfabrication, replica molding, and elastomer-based microfluidics.

"The innovative interdisciplinary research at the Harvard MRSEC creates the new frontiers of science and engineering to address critical societal issues and provide the necessary intellectual leadership to solve the challenges facing our country."

David A. Weitz, Director
MRSEC

HARVARD MRSEC OFFERS DIVERSE EDUCATION, OUTREACH AND PARTNERSHIPS...

- **P**artnership for **R**esearch of **E**ducation in **M**aterials with the University of New Mexico, Southwest Indian Polytechnical Institute, and Harvard trains students in cutting-edge biomaterials research and develops modules in with participants from the Albuquerque, Boston, and Cambridge public schools.
- **RET** – Research Experience for Teachers offers continuing participation in Center investigations and ongoing science education research.
- **REU** – Research Experience for Undergraduates provides summer engagement opportunities for undergraduates in current Center research.
- Partnership with local Museum of Science, Boston provides expert **professional development** training in public speaking and writing for undergraduates, teachers, and researchers.
- Center faculty led **course creation** of soft matter science and cooking for general education of undergraduates as well as developing new courses in creativity, innovation, and entrepreneurship.
- Host **community development** programs such as the Quarterly New England Complex Fluids Workshops with Brandeis, University of Massachusetts at Amherst, Yale and MIT.
- Have a broad range of **interactions with industrial scientists** from larger companies to the formation of new start up companies from Center research.
- Researc[illegible]s in the [illegible]sign and **bu[illegible]ustom t[illegible]**are new pr[illegible]s in mat[illegible]ice. The Un[illegible]sity has [illegible]e-art inst[illegible]mentation in fabrication

More information about the workshops, internships, partnerships, and educational opportunities are available at: http://www.mrsec.harvard.edu/education/education.php