MRS Volunteers Explain "Strange Matter"

Members of the Materials Research Society (MRS) and their colleagues are helping the public explore the world of modern materials by volunteering their expertise as scientific docents for the *Strange Matter* exhibition, which is currently traveling to science centers and museums around North America. Produced by MRS and designed to introduce science center visitors to and excite them about materials science, *Strange Matter* debuted in its large and small versions, respectively, at the Liberty Science Center in New Jersey and the National Atomic Museum in New Mexico earlier this year. The highly interactive and educational exhibit has also sparked the attention of a large volunteer base of materials researchers who are providing public demonstrations of the marvels of materials.

The larger, 6,000-square-foot exhibition offers scores of hands-on experiences, allowing visitors of all ages to investigate the structure of exotic as well as of ordinary materials and discover what gives them their remarkable properties. At the Liberty Science Center, 10 different exhibit areas and a live demonstration theater were included in the exhibition, which ran from January to May.

A highlight of the exhibition's stay in New Jersey was the large number of scientists—faculty, graduate students, and postdoctoral researchers—who volunteered almost every weekend to hold demonstrations. More than 20 scientists associated with the Princeton Center for Complex Materials (PCCM) took turns traveling to the museum to freeze balloons in liquid nitrogen, measure the force of crushing golf balls, and concoct unusual substances as part of the exhibit.

"The response has been tremendous," said Daniel Steinberg, director of outreach for PCCM. "The audiences have been packed, and the kids really have

The hidden and active science of materials shapes our physical world—from the mundane to the mysterious.

Visit ***Strange Matter*** at these locations

NOW: Hampton, Va. ~ May 29–Sept. 6, 2004
Virginia Air & Space Center

NOW: Ft. Lauderdale, Fla. ~ June 11–Sept. 6, 2004
Museum of Discovery and Science

Boston, Mass. ~ Oct. 2, 2004–Jan. 3, 2005
Museum of Science

Halifax, Nova Scotia ~ Sept. 25, 2004–Jan. 3, 2005
The Discovery Centre

Bloomfield Hills, Mich. ~ June 4–Sept. 5, 2005
Cranbrook Institute of Science

Boise, Idaho ~ Feb.–Apr. 2005
Discovery Center of Idaho

To volunteer for activities with the exhibition, contact
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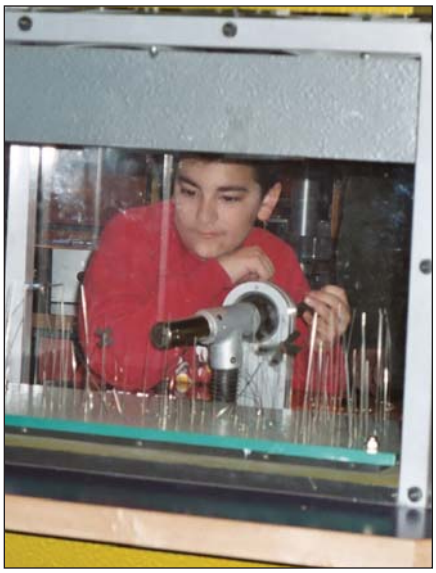
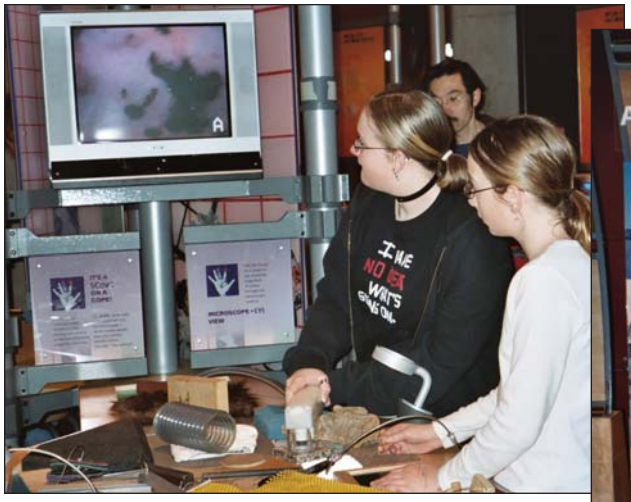


https://doi.org/10.1557/mrs2004.166 Published online by Cambridge University Press

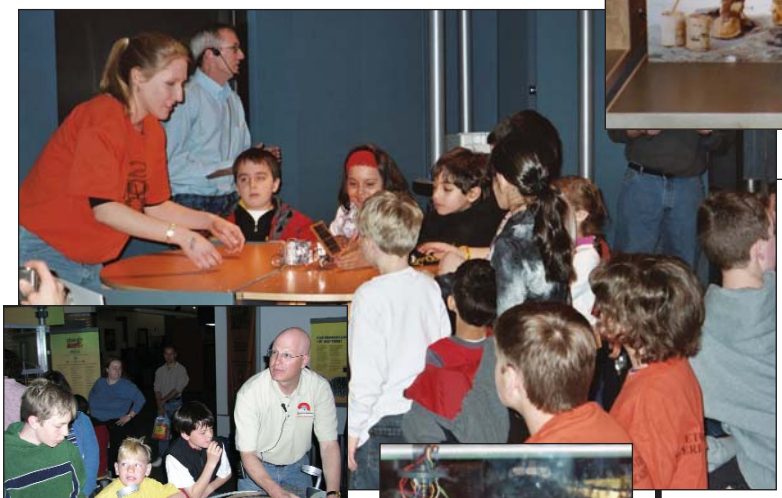
been wide-eyed with interest."

Elizabeth Romanaux, vice president for marketing at Liberty Science Center, said, "We have been very impressed with the commitment and dedication of the Princeton scientists. People who come to the science center often have never met a real scientist, so now they could see scientists are not just old guys in white lab coats. That's very important."

As the exhibit continued, the *Strange Matter* community resources coordinator, Kaveri Chaturvedi, a member of MRS, learned that the 100 volunteers who assisted with the exhibition was unprecedented in the science center's 12-year history. Volunteers from Princeton, Rutgers, Columbia, the State University of New York, and from other materials societies such as the American Society of Materials helped with the museum's in-house and



Visitors and volunteers of the MRS Strange Matter *exhibition at the Liberty Science Center in New Jersey and the National Atomic Museum in New Mexico explore the world of modern materials. Photos by Elizabeth L. Fleischer and Greg Johnston.*



Rutgers Students Volunteer at Liberty Science Center

Students from the Materials Engineering Department as well as from the Chemistry and Physics Departments at Rutgers University volunteered to assist with the *Strange Matter* exhibition at the Liberty Science Center.

Cari August, a graduate student in materials engineering, said "I was as excited to learn about the different exhibits as any of the visitors and I loved helping the kids understand more about science in the world around them."

The student volunteers attended a seminar given by museum personnel, in which they received an orientation to being docents and learned what the staff expected from them. As soon as the students were authorized to begin, they started helping out during some of the busiest times at the museum. On weekends and school vacations, the students were especially a welcome addition to the staff.

They circulated in the exhibit area, making themselves available to museum visitors. They directed visitors to displays that seemed appropriate to age and interest. The students felt most comfortable telling visitors how particular aspect of materials related to their own experience.

Dan Haders, a graduate student in materials engineering, said, "A relatively few number of important moments and occurrences influenced my decision to work in the field of materials science and engineering. Consequently, it is my hope that I created one of those moments for some of our younger visitors."

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https://doi.org/10.1557/mrs2004.166 Published online by Cambridge University Press

outreach programs associated with *Strange Matter*.

Romanaux, who worked with the PCCM delegation, said that the Princeton scientists want to continue volunteering at the science center even now that the exhibition has moved on. They plan to provide materials science demonstrations on various weekends several times a year.

There was also a tremendous response to the *Strange Matter* exhibition from the scientific community in New Mexico, said Chaturvedi. When the 1700-square-foot version opened at the National Atomic Museum, Jim Walther, museum director, welcomed materials researchers from the University of New Mexico and from laboratories and high-tech companies in the Albuquerque area to work as docents and tour guides for the exhibit. Children visiting the exhibit interacted with scientists, talked with college students, participated in demonstrations, and had the opportunity to discuss possible career paths in science.

The concept of *Strange Matter* began more than five years ago when some members of MRS discussed that as inspiring as materials science is to them, too few others knew about the field. An interactive exhibit seemed to be an exciting way to share their enthusiasm for the field with a broader audience.

Thus began a $3 million project that has consumed tens of thousands of volunteer hours from the materials research community in concert with professional science center staff and advisors, culminating in a unique hands-on materials science exhibition. Among the Society's goals for the project is for MRS scientists to improve public science literacy through active community outreach.

Shenda Baker, a professor of chemistry at Harvey Mudd College in Claremont, Calif., and chair of the *Strange Matter* project committee, said, "The exhibit is educational and accurate as it must be, but most of all, it's colorful and exciting with active experiences such as trying to break a pane of heat-tempered glass with a bowling ball and using a boot to squash metal flowers made with nitinol [a shape-memory alloy], then resurrecting them again using a heat blower. We wanted to have a big impact on visitors, and I think that's exactly what we've accomplished."

The demonstrations complement the various exhibition elements such as "Sand to Supercomputers," in which visitors touch the top of a giant, shining column of silicon grown from a seed crystal in a laboratory, following the painstaking process through which ordinary sand is transformed into microchips. With "Amorphous Metal," visitors drop one ball bearing on a platform made of amorphous metal and other ball bearings on several platforms made of metals with a crystalline (ordered) atomic structure, discovering that while some balls behave in an expected fashion, the one dropped on the amorphous metal bounces for an unexpectedly long time.

The *Strange Matter* project committee was composed of MRS scientists and distinguished members of related scientific communities to uphold the scientific integrity of the exhibition and its associated educational materials. In addition, experts and exhibit evaluators from the science center and education fields provided their special insight about the quality, educational effectiveness, and overall success of the program. The Ontario Science Centre in Toronto was commissioned to develop and fabricate the exhibition.

An interactive, award-winning Web site (www.strangematterexhibit.com) accompanies the exhibition, and provides a number of elements that supplement the exhibit experience. In addition to the exhibition and Web site, the *Strange Matter* team developed a teacher curriculum/activity guide designed to assist educators in integrating materials science into their curricula for fifth- to eighth-graders. The hands-on activities, based on National Science Education Standards, are designed to encourage exploration and inquiry. The teacher's guide is also available on the Web site.

Chaturvedi continues to garner volunteers as the exhibition travels to new venues. She said that the exhibition offers a unique opportunity for members of MRS, its sections, and university chapters, as well as researchers from Materials Research Science and Engineering Centers, to become involved with teachers and families within their communities.

"This is an opportunity for the scientific community to raise the level of materials science awareness in children in grade school, where they are most impressionable and likely to make choices regarding their future course of study," Chaturvedi said. "*Strange Matter* is 'science made exciting and approachable'—and we intend to maximize the benefit children receive from this exhibit by offering them contact with real-world scientists."

"We are looking for volunteers to help with outreach programs," Chaturvedi said, "as well as to facilitate understanding of the exhibit when it comes to visit individual science centers."

The larger version of the exhibition is now at the **Virginia Air & Space Center in Hampton, Va.**, and the smaller version is at the **Museum of Discovery and Science in Ft. Lauderdale, Fla.**, both until September 6, 2004. The exhibition is scheduled to travel to the **Museum of Science in Boston, Mass**. (October 2, 2004–January 3, 2005); the **Discovery Centre in Halifax, Nova Scotia** (September 25, 2004–January 3, 2005); the **Cranbrook Institute of Science in Bloomfield Hills, Mich**. (June 4–September 5, 2005); and the **Discovery Center of Idaho in Boise, Idaho** (February–April 2005).

To volunteer for activities with the exhibition, contact Kaveri Chaturvedi, Community Resources Coordinator, 8632 Simi Ln. NE, Albuquerque, NM 87113, USA; tel. 505-856-1318 and e-mail kaverisch@msn.com.

This exhibition and its tour are made possible by the generous support of the National Science Foundation, Alcan Inc., Dow, Ford Motor Company Fund, Intel Innovation in Education, and the 3M Foundation.

Volunteer's Jitters Dissipate during Teaching Session

I recently volunteered for the *Strange Matter* exhibit at the National Atomic Museum in Albuquerque, NM. It was really the opportunity I needed. While I am an engineer, I am like many of my colleagues who are nervous to get in front of people to speak. I imagined that substitute teaching may be a little stressful on my nerves, but this opportunity to teach small groups of young students at the museum was a great experience. At the beginning, I was "shaking in my boots," but toward the end, my nerves had calmed, and I was much more focused on the lessons.

Along with the young students at the exhibit, I also learned new information about our world of materials. I grew a knack for asking questions to help catapult the children's curiosity. A lot of the children that came, at first, were not interested in the exhibit; but after the teaching session and tour of the exhibit, each tended to have a major attraction to one or two stations. Of course, there were a few kids who were so bright and imaginative that they had answers for all of my questions!

I also am delighted that this program is volunteer-based. It shows that scientists are making a difference in every way to make materials concepts understandable to our future generations.

REFUGIO MANUEL ROCHIN

https://doi.org/10.1557/mrs2004.166 Published online by Cambridge University Press