

## MUSEUM STUDIES

The complexities behind everyday innovations often go unnoticed—that is, until we stop to look at a PDA or a laptop behind museum glass rather than just tapping at the keypad. Even more effective is taking that glass away: Especially for the under-10 set, pulling and poking at the guts of a cell phone or the gears of an engine may be the best way to start learning how things work. But these days, even the best exhibit cannot convey the full complexities involved in current science and technology.

Think about the post-9-11 anthrax scare, the rising price of fossil fuels, global warming, or the Columbia accident. We must know more than simply how or why these events occur, but how they influence our world. Carol Lynn Alpert A.B. '77, Director of Strategic Projects for the Museum of Science in Boston, is working to meet this need with help from the Nanoscale Science and Engineering Center (NSEC). As she explains in her essay, "Bridging the Gap," featured in the book *Creating Connections: Museums and the Public Understanding of Current Research*, "Every week now, it seems the public faces a range of new risks, requiring us to digest and weigh current research findings in making everyday choices."

Amidst the sensory overload of the museum—alive with snaking lines of giggling schoolkids, menacing life-sized dinosaur replicas, and the crackle of simulated lightning storms—rests her solution: the Current Science and Technology Center (CS&T). Each presentation on its open-air stage begins like an arena rock concert. A huge block of pulsing plasma screens descends from steel girders hung from the ceiling, while a thumping bass line begins to play. Appearing on stage is the live element in this virtual spectacle, a new kind of hybrid star described by Alpert

as the "scientist-educator-performance artist-journalist-multimedia producer-forum facilitator."

Education Associate Dan Davis deserves all of these titles. He deftly distills the latest research on advanced technologies like nanoshells and nanodots, combining sophisticated technology (including images of nanowires taken right from Harvard College Professor Eric Mazur's

lab) with simple, handcrafted devices such as Styrofoam models showing how nanometer-sized semiconductor crystals emit different colors of light. While this is heady stuff, Davis's engaging demeanor seems to calm any fears of hard science being too hard to grasp.

Davis's presentations on any given day, like much of the work of the CS&T, were likely developed that same morning. CS&T strives to keep pace not just with what's in the headlines, but with what's going on in cleanrooms and laser labs around Boston. Because the center provides live feeds to NECN (which reaches 2.8 million homes), primary research ends up grabbing some airtime even when its applications are not immediately apparent. Together with the live presentations and broadcasts, supplemental multimedia displays near the staging area and a robust Web site ([www.mos.org/cst](http://www.mos.org/cst)) enable individuals to dig into every aspect of a new device or emerging innovation.

Howard Stone, who has presented at CS&T, is excited about the Division's growing involvement

with the museum. "A relationship with the Boston Museum of Science is valuable—indeed critical—for the Division," he says. "We have an opportunity to expose young people to the unending series of questions, observations, and insights that research provides."

In addition to highlighting research at the Division and elsewhere at Harvard, CS&T gives some extra attention to our faculty and graduate students. Davis and fellow museum educator Joel Rosenberg spend part of their time training participating Cambridge high-school teachers and graduate students through the Cambridge-Harvard GK-12 program and other initiatives. With Alpert's help, Davis taught undergraduate researchers how to present information more effectively as part of the Division's Research Experience for Undergraduates (REU) program. Kathryn Holler, Director of Educational Programs at the Division and CS&T liaison, comments, "The relationship is mutually beneficial. While we provide the museum access to the cutting-edge research going on at Harvard, the

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Daniel Davis, Education Associate at CS&T, makes nanoshells visible to live and home audiences



Physicist Charlie Marcus, the new Director of CIMS, makes the quantum world visible by reaching out to the audience.

Museum of Science's expertise in engaging the public in science and engineering is a skill that is transferred back to our faculty, graduate students, and undergraduates."

In a short period of time, the CS&T program has enjoyed a great deal of success. People tend to mill around the presentation area, interact with the multimedia displays, and ask excellent questions. Getting access to science here and now, up close and personal, draws people in—Alpert reports that this section of the museum can keep viewers engaged for 20 to 30 minutes at a time, which is impressive by any standards. Building on these results, she hopes to extend the CS&T approach to many more science museums. "I think we've shown that the model works. Science museums are in a perfect position to meet a need," she says.

As tiny technologies become the new standard, going from micro to nano and the quirky quantum realm, programs like CS&T and the involvement of research institutions like the Division will only become more essential. A group at the museum recently joked that the exhibit on nanoscience would simply be an empty box. The NSEC-museum collaboration may lead to a more permanent, and most definitely visible, exhibit on nanotechnology that will serve as a model for other displays on small-scale science. Alpert hopes to establish a Nanotech Informal Science Education Resource Center to foster broad collaboration among research institutions and science museums, documenting and sharing the best practices in nanotech outreach exhibits, programs and materials, and facilitating their further development.

Of course, initiatives that bring more current research into museums are not intended to replace existing exhibits. At the Museum of Science, kids and adults can still play a game of virtual volleyball, take a seat in the Apollo capsule, or watch in fear and fascination as electricity crackles between two massive humming Tesla coils. In museums, as in academic research, it's the mix of the old and the new and the appreciation of the complexity of even the simplest problem that makes progress possible.

Ideally, Alpert hopes that efforts like CS&T will be an overture that ends up supporting her much broader mission of promoting science and technology. "I'd make sure every youngster got to see pond water through a low-power microscope, got to look at plasticinated human bodies, and got to see the mystery of the origin of the universe splayed out in the night's sky in a place far from city lights," she says. "I'd teach every child how to listen well, think critically, question authority, and articulate clearly. I'd put the values of integrity, honor, service, courage, and compassion at the top of the agenda." \*

For more information about CS&T and NSEC, visit

[www.mos.org/cst](http://www.mos.org/cst)  
[www.nsec.harvard.edu](http://www.nsec.harvard.edu)

## TECH LAUNCHES INNOVATION PROGRAM

The Technology and Entrepreneurship Center at Harvard (TECH) has established an interdisciplinary program on Innovation in Science and Engineering with lead sponsorship from Altran Technologies and Arthur D. Little. The program stems from two years of teaching and collaboration among members of the Division, Altran, and its affiliate company, Synectics, Inc.

Altran and Arthur D. Little, led by CEO Michel Friedlander, will contribute funding and services to the initiative over the next five years, and will bring Innovation Fellows together with winners of the Altran Foundation's Interna-

tional Innovation award and their team of Altran advisors.

The program will support a host of new endeavors and expand existing ones—such as the Innovation in Science and Engineering course that was developed in 2003 by David Weitz, Professor of Physics and Gordon McKay Professor of Applied Physics; with Altran CTO Thomas C. Esselman with help from Paul Bottino, TECH's Executive Director. Through collaboration with Rick Harriman at Synectics, TECH will now be able to offer the same professional-level team dynamic and innovation training given in the course to a wide

range of research and other inventive academic groups.

"This is a great addition to the TECH program and our efforts to advance the understanding and practice of translating science and technology into societal benefit," Bottino says.

Marissa R. Olson and David S. Ricketts were named the inaugural Innovation Fellows for 2004. Both are pursuing their doctorates at DEAS; in Applied Physics, Olson is conducting optoelectronic device research, and in Electrical Engineering, Ricketts is investigating soliton electronics. \*