RISE: A Community-Focused Strategy for Public Engagement

By Carol Lynn Alpert

Fostering effective nanoscale Research Center–Informal Science Education (RISE) partnerships is a key strategic focus for NISE Net over the next three years. The goal is to build capacity for the continued development and dissemination of nanoscale ISE resources beyond the term of direct NSF support.

The RISE strategy is based on the notion that both the educational outreach efforts of university-based research centers and the current-science-and-technology interpretive efforts of science museums will be more effective if they are pursued collaboratively, leveraging the strengths of the respective organizations. The strategy is also community-focused, enhancing public engagement through cross-cutting professional relationships and joint activities and strengthening local connections among researchers, educators, and museum staff. Best of all, the strategy doesn't depend on volunteer efforts; instead it offers significant incentives for research centers and funders to provide support for educational outreach.

To illustrate these points, here's what happened when the Museum of Science, Boston, entered into partnership with a local nanoscale research center.

Building an institutional partnership

Six years ago, as chief developer and manager of the museum's newly minted Current Science & Technology Center (CS&T), I got a call from Harvard physics professor Bob Westervelt. He and colleague Bert Halperin wanted to come by to discuss a proposal they were making to NSF to launch a Nanoscale Science and Engineering Center. (For their take on the story, see "Nanoscience for the Public," page 8.) The two had seen our CS&T setup and thought it might make a good venue for pursuing their public outreach goals. Since ours was essentially a development and delivery infrastructure, ready to be filled with engaging content, I was happy to meet with them.

Harvard graduate student Tina Shih discusses nanoscience with a CS&T visitor. *Photo courtesy Museum of Science, Boston*

The Harvard scientists were not only committed to bringing the work of nanoscale researchers to public attention; they also wanted to respond effectively to NSF's "broader impact" criterion. This is one of two primary criteria ("intellectual merit" is the other) used by the foundation since 1997 to evaluate the strength of research proposals. One broader impact recognized by NSF is enhancement of science and technology understanding among students, teachers, and the general public.

A partnership with the Museum of Science, Bob and Bert thought, would provide a platform for sharing their research with the public and access to the museum's already well-developed student and public audiences. The NSEC could send researchers over to give talks on the CS&T stage, right in the middle of the exhibit halls.

I welcomed this idea and also shared my concern that few researchers have the experience and skills to engage general museum audiences in this kind of forum. Our "free-choice" audiences expect entertainment, interaction, and relevance; they tend to shy away from lectures of the type that researchers are schooled to give to students and professional colleagues.

The museum had enjoyed previous education-outreach partnerships with research centers. In fact, our 2000 Science Education Partnership Award (SEPA) grant from the National Institutes of Health had connected us with seven Boston-area health science research institutions and provided funding for full-time museum education associates. We found then that if we hired people with terrific science communication skills plus graduate-level backgrounds in health-science-related areas, we could provide quick turnaround exhibits and programs. Our new staffers kept CS&T up to date by developing presentations, exhibits, media, and guest researcher events on current health science research and "hooked" audiences by linking to related news headlines.

I asked Bob and Bert to consider adding to their proposal support for a full-time senior education associate at the Museum of Science, as well as tools for media and small-exhibit production. As part of the job, the education associate could also curate effective interactions with guest researchers.

Not only did Bob and Bert write the museum into their grant application;

they underlined their NSEC's commitment to educational outreach by making us a full partner in the project, along with M.I.T. and the University of California–Santa Barbara. Not long after, the proposal was funded.

Results of the collaboration

Since Harvard launched its NSEC, each annual NSF site-visiting committee has awarded high marks for its educational outreach activities. The center was recently renewed by NSF for an additional five years. Our efforts were joined three years ago by another NSEC, the Center for High-rate Nanomanufacturing (CHN) at Northeastern University and the University of Massachusetts–Lowell. Led by Ahmed Busnaina, CHN also included the Museum of Science in its NSF proposal, allowing us to expand our program to include two full-time nanoscale education associates and professional development activities.

As of October 2007, 38,000 people had attended 985 live Museum of Science staff presentations on nanotech research and 33 guest researcher events. The 44 nano "SciTech Today" segments we produced for New England Cable News had each been viewed by 9,000 to 19,000 households; our 25 nano podcasts had each been downloaded by 5,000 to 7,000 people; and a total of 240 teachers had attended our yearly Nanotech Symposium for Educators. Partners at both NSECs leave selection of topics and stories to museum staff; we "cover" the spectrum of nanoscale research as we see fit.

The experience we gained by working with these two nanoscale research centers helped build our confidence—when the opportunity arose—that the Museum of Science could play a key role in developing a national infrastructure for nanoscale informal science education. Input from our NSEC partners helped convince NSF that a nationwide NISE Network could foster similar partnerships elsewhere—hence the inclusion of RISE as an integral part of the NISE Net strategy.

Looking ahead

The model described here is just one of many possible types of research center–science museum partnerships. Such collaborations have already produced major nano traveling exhibitions, community forums, and planetarium shows. While RISE focuses on funding professional ISE work through institutional partnerships, NISE Net is also working with ASTC, the Materials Research Society, and the IMLS-funded Volunteers TryScience (VolTS) initiative to encourage individual involvement of nano and materials science researchers with museums on a volunteer basis (see *ASTC Dimensions,* September/October 2007).

Upcoming RISE efforts will include a campaign to raise awareness among stakeholders through journal articles and presentations at professional meetings, as well as match-making/consulting services and guides for planning collaborative activities. Though our current focus is on nanoscale informal science education, our long-term objective is to foster an ongoing culture of partnership that can effectively engage public audiences in any and all future domains of research. ■

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Scientists Speak about Nano . . .

Nanoscience and the Public

By Bob Westervelt

When the National Science Foundation's National Nanoscale Initiative (NNI) was authorized in 2001, researchers were pleased. At last Congress recognized how important it was to understand how things work on the nanoscale, the level at which we can see the quantum nature of objects and understand the inner workings of biological systems.

As my colleague Bert Halperin and I began work on a proposal for an NSF-funded Nanoscale Science and Engineering Center (NSEC) at Harvard, it was clear that we must actively engage the public. Many academic researchers would like to inform the public about nanoscience, but don't know how to do it. Science museums, on the other hand, are keen to get people's attention, show them what is happening, and invite them to think about the big ideas. A collaboration with a science museum would be an excellent way to involve the public with our research work.

Bert and I visited Carol Lynn Alpert at the Museum of Science, Boston, to discuss how to proceed. At the time, the museum was developing its Current Science & Technology (CS&T) program. Presentations about new discoveries were made by talented staffers, backed by an impressive array of video displays, on a suspended stage in an exhibit hall. CS&T also held public forums on important topics. We decided to make the museum a central partner in our proposal.

After our NSEC, officially titled "Science of Nanoscale Systems and Their Device Applications," was funded, I talked with Joel Rosenberg, the Museum of Science educator hired to work with our project, about the goals of the center and introduced him to NSEC researchers. Joel also attended lectures in which faculty presented their work. The entertaining, well-informed shows on nanoscience and nanotechnology that he developed for the CS&T stage generated a lot of interest and questions from visitors. His work has subsequently been ably carried on by CS&T staffers Daniel Davis and Tim Miller, and researchers have also presented shows at the museum.

The collaboration continues to benefit all parties. Graduate students who work at the museum connect with the public at an early stage and learn how to integrate their plans and careers with issues of public importance. Museum visitors are drawn into engagement with advances that excite researchers, such as carbon nanotubes and bucky balls, and with larger questions, such as "good" vs. "bad" science. They can see why academic scientists find nanoscience so involving—and can raise any concerns they may have about the new technologies.

This model is now being extended to research centers and science museums across the United States. Headed by the Museum of Science, the NSF-funded NISE Network offers the experience and skill to build collaborations and help scientists bring their ideas to the public.

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