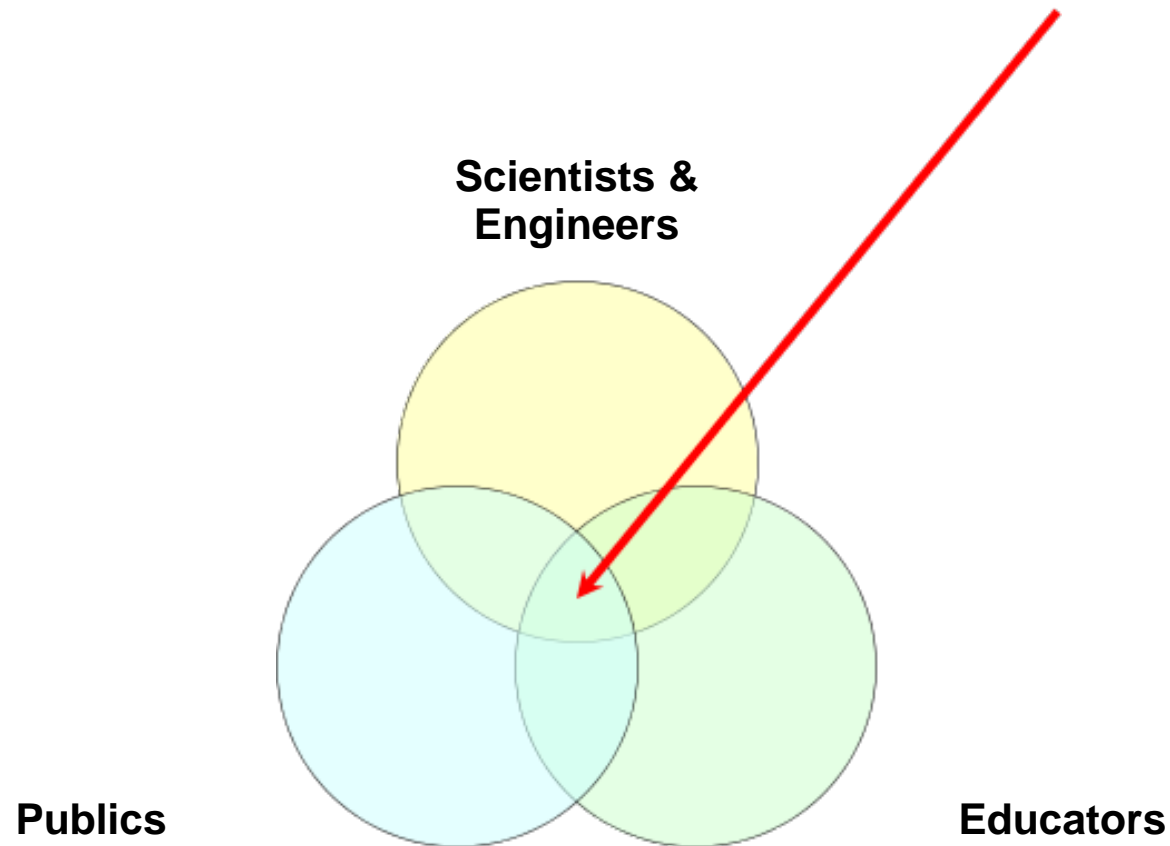


Developing an Infrastructure of Partnerships to Support the Engagement of Scientists and Engineers in Education and Outreach for Broad Impact

Eric D. Marshall (New York Hall of Science)

Science Museums



Infrastructure of Partnerships

Why: Goals

Who: Organizations and Roles

What: Forms

How: Process

Where: Interface

Goals

*Science museums
and
many scientific and technical
institutions and organizations*

**share the same mission
of education and outreach,
yet we come from "different worlds."**

(conversation with Jill Andrews, NRCEN)

Different Worlds

Science Museums

Partnering with
Scientists & Engineers in:

Corporations

Universities

Government Labs

Professional Associations

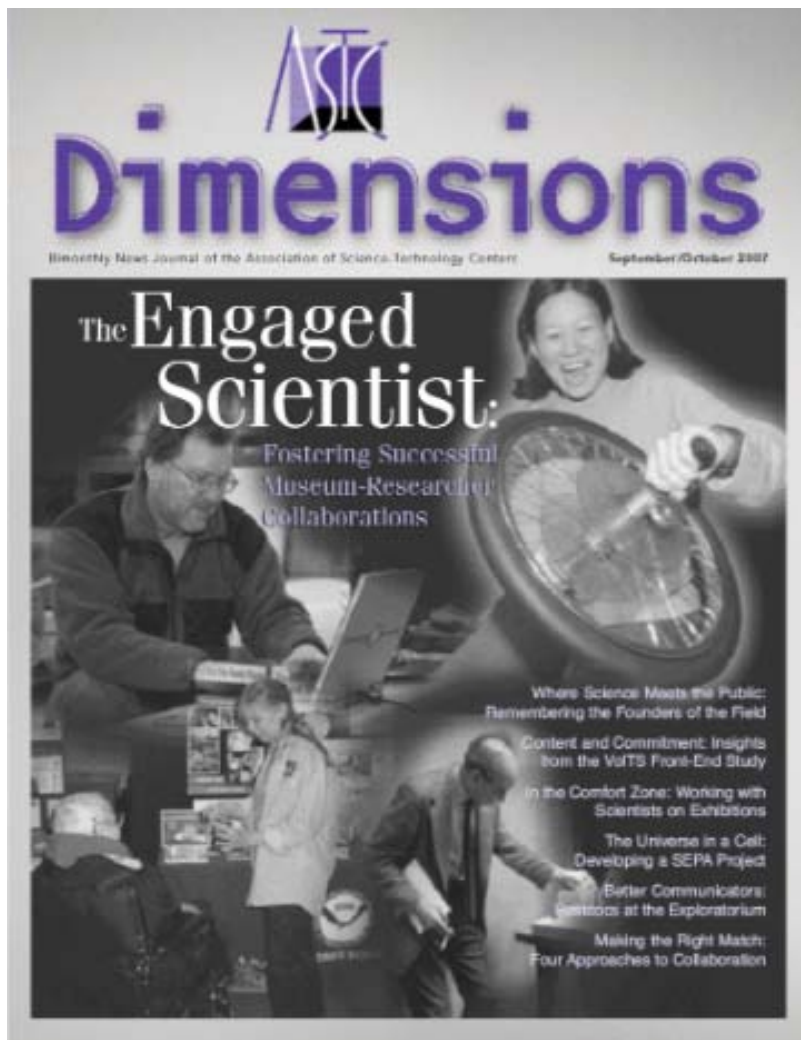
Roles: Organizations

While science museums' missions focus on public education and outreach, this is only a part of most scientific & technical organizations' missions

Sustainable partnerships result from organizations

- with staff dedicated to education and outreach
- and/or volunteer/outreach ethos, structure and support

Roles: People



A Passion for Public Engagement

By Eric Marshall

Scientists and engineers have a natural affinity for science centers and museums. This engagement may go back to earliest childhood, or it may arise at various points in their professional lives.

Growing up in Los Angeles, I developed a great love for the California Museum of Science and Industry (now the California Science Center). Coming face-to-face with their



After appearing on the cover of *Physics Today*, the author was inspired to make education his vocation. Photo courtesy Eric Marshall

roaring jet engine and the Moebius Band in Mathematics contributed to my motivation to pursue a doctorate in applied physics.

Other professionals may get hooked in high school or in college, when they have time to explore potential public engagement with few external demands. As an undergraduate at the University of California-San Diego, I volunteered

capacity, I knocked often at Alan Friedman's door. The New York Hall of Science director graciously invited me to help with museum projects like their Technology Gallery.

Eventually I became sufficiently motivated to switch my avocation to a vocation. An appearance on the cover of a 1991 *Physics Today* issue on precollege education, closely followed by a colleague's untimely death, pushed me closer to a career change. I started within IBM, initiating a group focused on ways to use technology to break down classroom walls. One of our goals was to foster more resilient connections with community organizations like science centers.

I enrolled in graduate courses at Teachers College and subscribed to the *ASTC Newsletter* (now *ASTC Dimensions*). There I saw a job description from the California Science Center that seemed to have been written just for me. I got the job and felt accepted from the start. Changing to the science museum world satisfied my yearning to move beyond the confines of my technical expertise. It allowed me to engage in dialogue regarding the larger questions driving this work—the kind of questions I'd explored in my Student Puqwash days.

Professional Societies

Materials Research Society

- Public Outreach volunteer committee
(subcommittees: NISE Network, Strange Matter, NOVA)
ex: NISE Network (Nanoscale Informal Science Education)
volunteer recruitment
interface with materials research Centers
program support
conference engagement
- Staff



Professional Societies

IEEE

- Educational Activities Board (volunteer) including pre-university education programs
- Educational Activities Department Staff
- Awards

including Informal Education Award

- Regional and Local Section Structure including volunteer Education Coordinators
- Education Society
- TryEngineering.org website
- Volunteer parent/child science museum reviews



Professional Societies

Many Others

- Annual Events mobilizing *volunteers* (e.g., American Chemical Society – National Chemistry Week [Great Lakes Science Center, below])
- *Media* partnerships (e.g., Sigma Xi [500 North American chapters] with WGBH Science Cafés, often in museums)
- *Underrepresented* groups (e.g., Latinas en ciencia – Society for Advancement of Chicanos and Native Americans in Science (SACNAS) and OMSI [Oregon Museum of Science and Industry])



Corporations

Volunteers

- IBM On Demand Community recruitment/support
- Events (La Familia:)



- Short-term and long-term sourcing of volunteers

Universities

Research Centers with Education and Outreach Staff

ex: NSF Research Center Educators Network (NRCEN)

NRCEN's Mission is to "facilitate and promote communication and collaboration within the National Science Foundation's Research Centers Educators Network (NRCEN) and serve as a resource for the wider Education and Outreach community."

Interns, Mentors

Provost/Dean-level support for outreach

Professors (tenured and not), postdocs, students

Student organizations and campus chapters of professional organizations

Government Labs

Some have their own outreach centers/museums



National Renewable Energy Laboratory Science Outreach Center



Others organize to support education and public outreach

- NASA
- NOAA
- ..

Forms

Many partnership forms in addition to direct public engagement:

- Behind the scenes
 - training museum staff
 - museum and foundation board members
 - advisory and focus group participation
 - exhibit development (design, build, assets)
 - curriculum and program development
 - fieldwork/curatorial support
 - specialized support (e.g., aquarium care)

Forms

Many partnership forms in addition to direct public engagement:

- Engaging the public at the museum
 - demonstrators
 - presenters
 - docents
 - interpreters
 - speakers
 - mentors
 - role models for youth programs

Forms

Many partnership forms in addition to direct public engagement:

- Community outreach
 - community special events
 - science fairs
 - contests
 - Q&A for community/media
 - school visits
 - teacher professional development
 - electronic education/videoconferencing

Forms

Time and intensity can vary to meet the needs of partners:

- One-time to long-term
- Casual to intensive

Process:

Some Obstacles to a Healthy Relationship

- Funding
 - Co-write grants
- Expectations
 - Classroom vs. public
- Finding the right people
 - Find scientists on staff at museum
- Unfamiliar environment
 - Engage museum visitors within 2 minutes
- Politics
 - “Museum already had all the expertise they needed”

2007 NRCEN Workshop Discussion

Process:

Characteristics of a Healthy Partnership

Initial Contact/ Recruitment

- Contact/buy-in by “higher-up” personnel
- Awareness of S&E/ science museum opportunities
- Devoted resource(s) to develop/maintain partnerships (staff or \$)
- Existing relationships with corporations, professional societies, universities to foster partnerships
- Student and/or early career S&E involvement

Volunteers TryScience Front-End Evaluation, Randi Korn & Associates

Process: Characteristics of a Healthy Partnership

Relationship Building/ Partnership

- Match expectations (define work, scope, and timeframe)
- Science communication skills at science museum
- Match expertise
- Opportunities based on current work/research

Volunteers TryScience Front-End Evaluation, Randi Korn & Associates

Process: Characteristics of a Healthy Partnership

Engagement

- Use expertise
- Limit training
 - Mutually beneficial relationship involving learning through collaboration is more attractive than traditional training
- Partner

Volunteers TryScience Front-End Evaluation, Randi Korn & Associates

Process: Characteristics of a Healthy Partnership

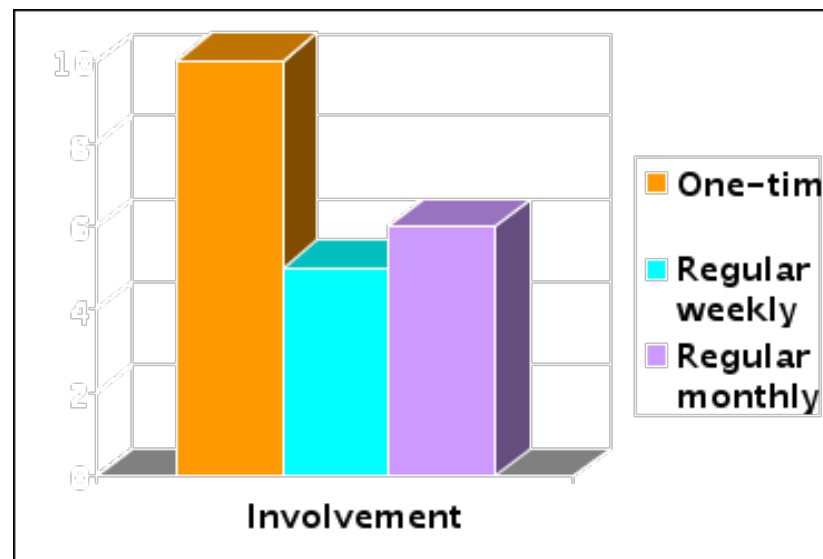
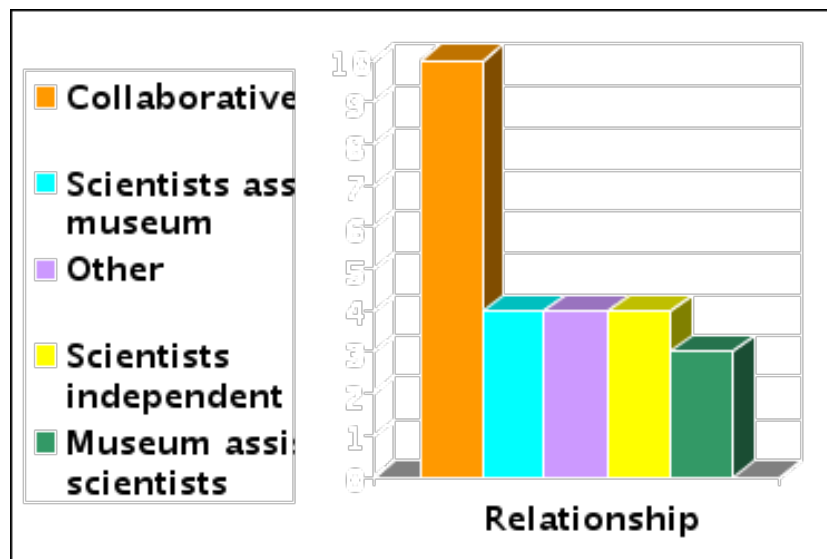
Recognition

- Provide feedback
- Promote work via PR venues
- Dedicated work space
- Appreciation receptions

Volunteers TryScience Front-End Evaluation, Randi Korn & Associates

Process: Characteristics of a Healthy Partnership

***Collaborative relationships
tend to correlate with regular involvement***



Preliminary results from materials research center education directors' surveys

Building Infrastructure to Support Partnerships

