

**Title of Investigation:**

The Pavilion: Collaboration Between Art and Technology

**Principal Investigator:**

Joseph M. Howard, 551

**Other Investigators/Collaborators:**

Randall Packer, American University (AU)

**Initiation Year:**

FY 2003

**Aggregate Amount of Funding Authorized in FY 2003 and Earlier Years:**

\$4,500

**FY 2004 Authorized Funding:**

\$4,000

**Actual or Expected Expenditure of FY 2004 Funding:**

Computers to support Pavilion installation (audio processing) \$2,900; audio hardware and other support electronics, \$800; additional mirrors, \$300

**Status of Investigation at End of FY 2004:**

To be continued in FY 2005 with \$1,000 in additional Director Discretionary Fund money

**Expected Completion Date:**

September 2005

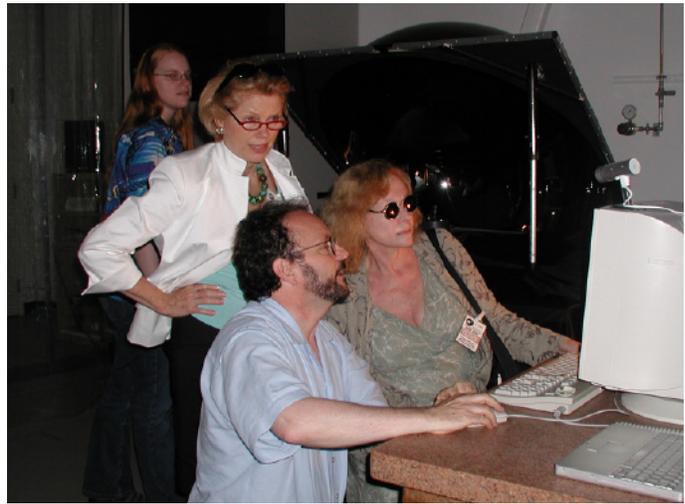
**Purpose of Investigation:**

The goal of the FY 2004 portion of the Pavilion project was to complete a scale model representation of the original Pepsi Pavilion presented at the 1970 Expo in Osaka, Japan. The Pepsi Pavilion was one of the first exhibits to completely immerse a large number of viewers into an interactive environment. At its heart was a 30-meter diameter dome mirror that completely surrounded the viewers. Those who visited the pavilion experienced real images of themselves and others. (A real image is light from some object which is focused at another location). In this case the image results from the curvature of the mirror, and is located in an accessible location between the dome mirror and the viewer, allowing visitors to visually shake hands with themselves, or even to pass through their own images. (A virtual image, on the other hand, appears to be behind a mirror, in space where the light from the object does not actually travel, such as the image a person sees on a flat bathroom mirror.) The Pavilion Project model recreates a portion of the Pepsi Pavilion experience and extends it using a networked environment. Images are uploaded to the Pavilion Web site via the Internet and projected onto the 48-inch mirror dome; then a camera retrieves the reflected real images, which are processed and sent back to the viewer.

*Figure 1. The Pavilion Project Open House at the Goddard Space Flight Center on May 12, 2004*

**FY 2004 Accomplishments:**

The major efforts in the early part of FY 2004 involved the final assembly and preparations for our open house preview at the Goddard Space Flight Center on May 12. Our part-time intern student, Wes Smith, was available only through June, which further motivated us to complete this phase of the project. The Pavilion preview drew a crowd of about 30 visiting artists, students, and NASA employees. Several collaborators on the original pavilion attended, including Bob Whitman and Julie Martin, who both drove down from the New York area. One week before the preview, we discussed the programming aspects of the project during an on-site class lecture with about 20 students from the Maryland Institute College of Art (MICA).



Following the open house, preparations were made to move the Pavilion to the co-investigator's American University (AU) studio during the summer. The project move coincided with Dr. Packer's new faculty position at AU; he previously worked at MICA. This move allows greater control over the network environment for Internet broadcasting and a more permanent location for project development.

Finally, the year concluded with an open house reception at Dr. Packer's studio on November 19, 2004, where AU faculty and students were invited to view and interact with the Pavilion. By this time, we had received two additional mirrors as backups. We displayed one so that viewers could observe their own real images without interference from all of the cameras, display, and cables, as seen in Figure 2. This simple wall display has proven quite popular, and will ultimately influence the next phase of the project.

*Figure 2. The Pavilion Project Open House at American University on November 19, 2004*



**Planned Future Work:**

Discussions are underway with the Goddard Visitor Center to present the Pavilion in some form as an interactive display, which would appeal to many of the younger people who visit. We will present many of the Pavilion's fundamental concepts, using a wall-mounted mirror, along with informative posters discussing the project and the difference between real and virtual images. This display will be ready in late spring of 2005. The closure of the visitor center exhibition will conclude Goddard's lead role in the Pavilion project. It will then be transferred to Dr. Packer at AU.

**Summary:**

The project's innovative features included real-time viewing over the Internet of real images created by spherical dome mirrors, creating an immersive environment for the viewer. Goddard benefits from the investigation in the form of outreach to the arts community and to the general public. In addition, Goddard will be recognized as the leader of the project after it moves to AU. From a technical point of view, the closed-loop streaming images that we demonstrated on November 19, 2004 constituted a success. From a programmatic perspective, we will consider the effort successful if we get corporate and foundation sponsors. The primary technical risk factor for achieving success has been the ability to provide the viewer with the appropriate access to the dome environment (i.e., not cluttered with cameras and projectors) to create the full immersive feeling that the viewer felt in the original Pepsi Pavilion.