"Painting relates to both art and life. Neither can be made. I try to act in that gap between the two. A pair of socks is no less suitable to make a painting with than wood, nails, turpentine, oil, and fabric."

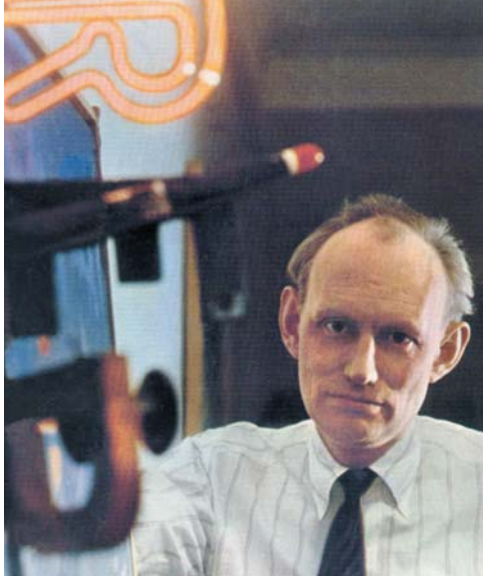
— Robert Rauschenberg

Experiments in Art and Technology

by **Julie Harrison**

Art is technology. Since the Lascaux cave paintings, visual art has served to represent, signify and communicate. Like language itself (first spoken, then written), art has served for millennia as a defining "extension" of humankind and, consequently, has an uneasy alliance with subsequent competing technologies. As one contemporary artist put it, "Technologies solve a general need within a culture, and the artist uses technology to give meaning to a culture." The more prominent usage of the word technology would place it within the domain of science and engineering, particularly toward industrial and commercial applications and the notion of "progress." It is important to remember that it has not always been so — indeed art and science have learned much from one another.

Photographs courtesy of Julie Martin



Opposite page: **Billy Klüver** and **Robert Rauschenberg** with *Oracle*, 1965.

Left: **Billy Klüver** stands with **Jasper Johns**'s *Field Painting*, for which Klüver devised the neon letter R, run on batteries mounted behind the painting.

E.A.T.'s basis of integrating media and giving audience members complete control over their aesthetic experience by interacting with it was groundbreaking.

The history of the use of technology by artists is well documented, particularly in the modernist period — think of the Futurists, for example, or the mechanized sculptures of Marcel Duchamp. The reverse is not always so obvious. One prominent example is Experiments in Art and Technology (E.A.T.), sponsored by Bell Laboratories in the 1960s. Beginning in the fall of 2004, Stevens Institute will join this rich legacy of cooperation between the sciences and the humanities with a new Department of Art, Music & Technology, the brainchild of Dean Erich Kunhardt.

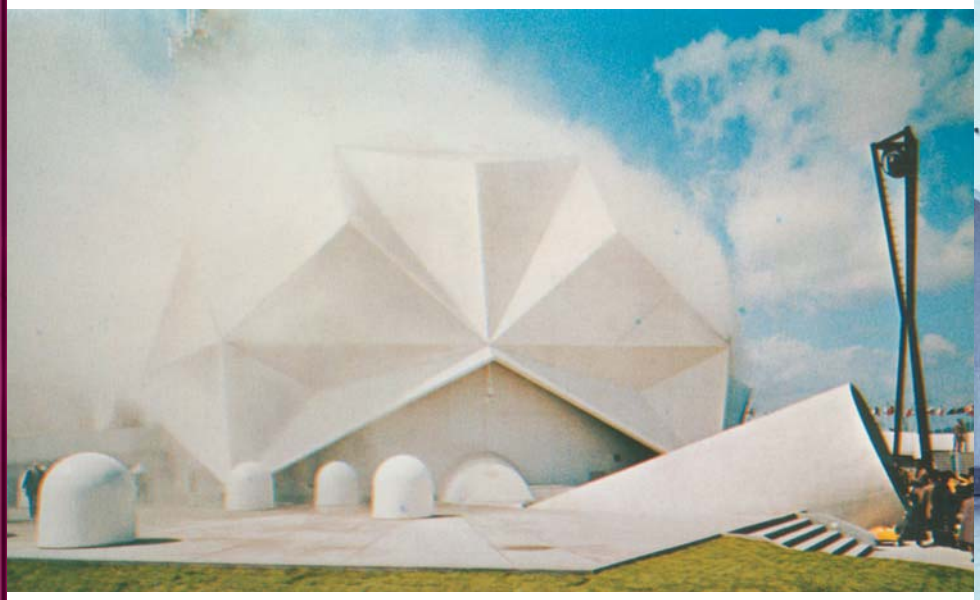
E.A.T.'s avant-garde performances and installations, originally presented in the basement of Judson Church in Greenwich Village, grew into a roster of multi-talented artists, engineers, architects, designers, and builders working with corporate compliance on the Pepsi Pavilion for Expo '70 (the Osaka World's Fair), a project/event which has arguably surpassed any kind of collaborative achievement in art before or since.

Unlike today's corporate culture, where support for the arts is often perceived as a public relations campaign veiled as patronage, Bell Labs' response to the arts during E.A.T.'s tenure was somewhat altruistic. Whole rooms of sophisticated high-tech computers (like the ENIAC) — that were heretofore inaccessible to anyone but the highly skilled and highly paid — were made available to young experimental artists for creating during the quiet hours of the night. Engineers, scientists and artists worked together — ultimately hundreds of them — resulting in numerous exhibitions over the years. This is no small feat, given the modern emphasis on specialization and the nature of their work: one generally tends to work subjectively, intuitively, in visionary terms and the other objectively, systematically in control, making it often difficult to communicate with one another. Ultimately, 28 chapters of E.A.T. were founded by regional artists and engineers across the U.S. and their legacy lives on at www.eatnet.org. In the late 1960s, E.A.T. represented a new vision to expand the artist's role in contemporary society and eliminate the separation of the individual from technological change.

E.A.T. was formed in 1966 by Bell Labs' Billy Klüver, an electrical engineer from Sweden, and Robert Rauchenberg, then a young American artist interested in combining elements of media and popular culture with technology. Klüver's previous collaboration with artist Jean Tinguely on the infamous self-destructive kinetic sculpture, *Homage to New York* (exhibited in 1960 at the Museum of Modern Art for 27 minutes before disintegrating), and his work with Andy Warhol, Merce Cunningham, and John Cage, had placed him among some of the most ambitious, forward-thinking artists of the day. Klüver's ability to enthusiastically inspire other engineers to work with the artists was crucial. E.A.T. was in an ideal position to act as a liaison between artists, engineers, and corporations and to provide a meeting place where seminars, lectures, and demonstrations could be presented.

The group (it had not yet been officially named) held its first public event at the 69th Regiment Armory in New York City in 1966. *9 Evenings: Theatre and Engineering,* a series of collaborative performances (albeit technically flawed, which resulted in long delays between works), was attended by well over 10,000 people and received much critical acclaim. Klüver estimated that "the 30 engineers who participated in the project put in 8,500

Pepsi Pavilion, 1970, Expo '70, Osaka, Japan.



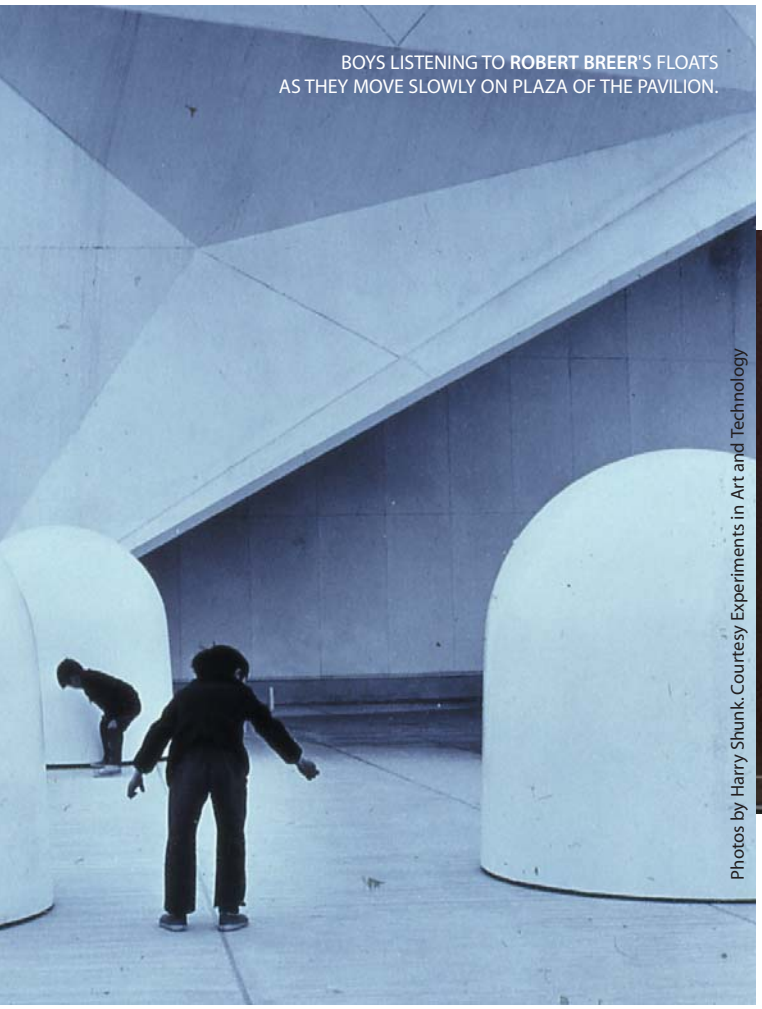
man-hours of work." *9 Evenings* incorporated interactive sound, slides, film, dancers, and sculptures with the audience, and managed to galvanize the concept of collaboration and create enormous interest in using new technology among artists in New York.

E.A.T.'s realization of the Pepsi Pavilion in Japan four years later was an arduous process of trial and error. Certain visionary concepts were not possible to translate technically. So too, the differences of language, equipment and the distance between the two countries necessitated changes. Despite this, the engineering feats and E.A.T.'s basis of integrating media and giving audience members complete control over their aesthetic experience by interacting with it was groundbreaking.

The idea of creating an art that would respond and change to a viewer's action paralleled many artists' attempts at the time to merge art with life, or at least to work between the boundaries — to make art that was more integrated and reflective of life rather than separated from it. The kind of interaction associated with the Pavilion was a precursor to what is now commonplace among the computer game industry, with virtual reality a close second. Of course, modern art history is replete with innovative aesthetic inventions that have later been incorporated into more profitable ventures. But that's another story.

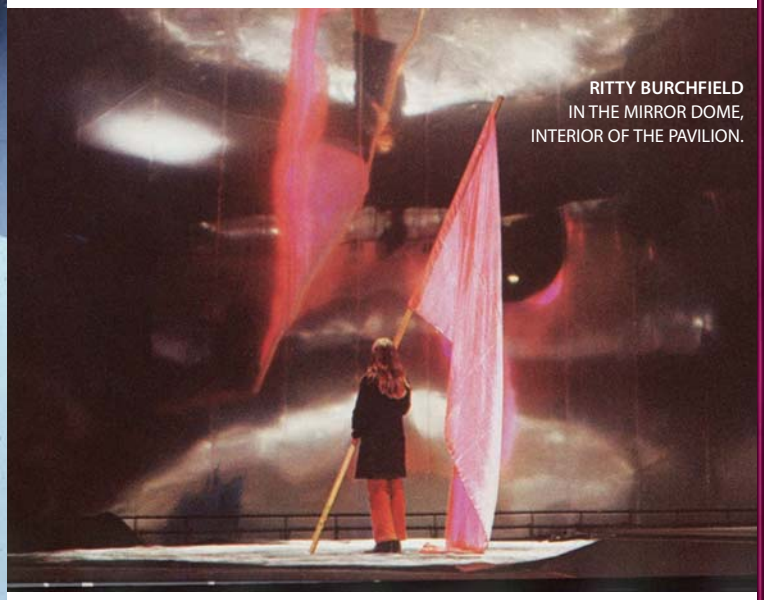
The Pavilion was a living responsive environment. Outside, the roof of a geodesic dome was covered by a water vapor cloud sculpture designed by Fujiko Nakaya, creating a 6-foot wall of fog which responded to the weather. A sculpture called the Suntrak, created by Newton Harrison, followed the path of the sun's rotation (even at night, pointing down to the center of the earth). Robert Breer's six-foot high, 800 pound sculpture/floats moved slowly around the plaza emitting sounds (from internal tape recorders) like sawing, a truck starting up and driving away, a group of people describing a view and humpback whale songs. When the sculptures hit an obstacle or were pushed, they would automatically reverse direction. A laser sculpture by Frosty Myers framed the pavilion at night by creating a narrow beam of light between each tower.

The audience entered the Pavilion through a long tunnel which brought them into a room lit only by moving patterns of laser light activated from the sound system, designed by Lowell Cross. Upstairs in the main space, a huge mirror dome made of aluminized mylar was held up by fans. Billy Klüver describes it thus:



BOYS LISTENING TO **ROBERT BREER**'S FLOATS AS THEY MOVE SLOWLY ON PLAZA OF THE PAVILION.

Photos by Harry Shunk. Courtesy Experiments in Art and Technology



RITTY BURCHFIELD IN THE MIRROR DOME, INTERIOR OF THE PAVILION.

"By having a negative pressure air structure, there was no need for cumbersome air locks. This optical effect in a spherical mirror of producing a real image resembles that of a hologram. The difference is that because of the size of our mirror, a spectator looking at an image could walk around the image and see it from all sides."

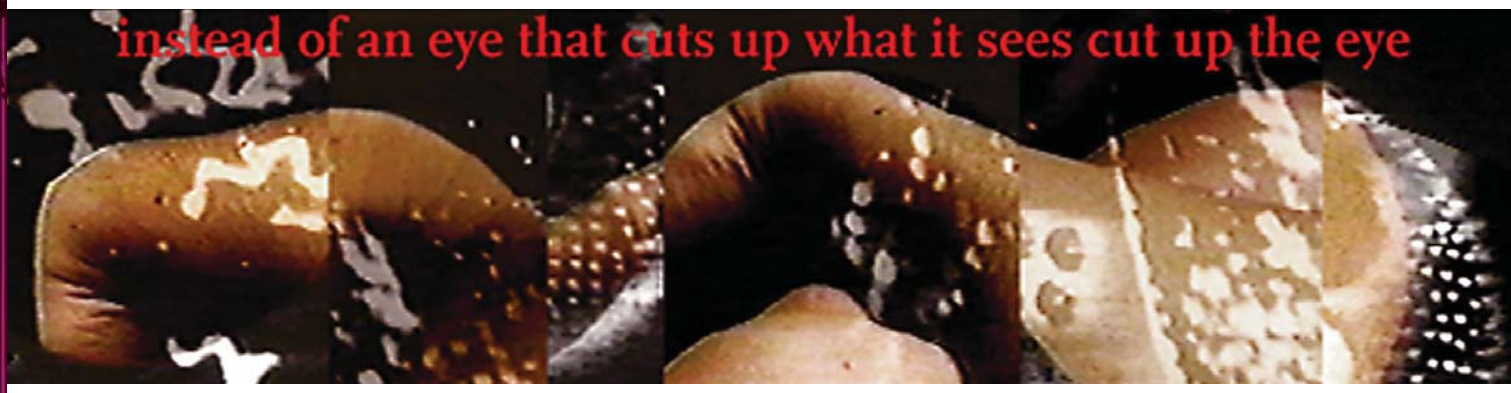
The sound system, created by David Tudor, with 32 inputs and 37 speakers was treated either as a pre-programmed instrument or controlled in real time by the artists from a console at one side of the dome. Sound could be moved at varying speeds and in different configurations throughout the dome.

"The floor was divided into 10 areas made up of different materials, such as astroturf, rough wood, slate, tile, asphalt. Through handsets visitors could hear specific sounds on each different floor material. On the tile floor: horses hooves and shattering glass; on the astroturf: ducks, frogs, cicadas and lions roaring. These sounds were transmitted from wire loops embedded in the floor."

The participation of the audience in controlling or manipulating sound and image rather than passively viewing a story was like a scientific experiment — an early example of interaction that can be traced back to the ideas of Marcel Duchamp, who's notion that the audience complete the work rather than being passive and without input was scandalous in the early 20th century. Unfortunately, due to budgetary overruns, the experiment between Pepsi-Cola and E.A.T. was dissolved shortly after the World's Fair came to an end.

Nonetheless, the use of technology became de riguer for some artists by the mid-1970s — the advent of Sony's consumer video gear in 1967 being at the forefront of this evolution — and was embraced by cultural institutions (for example, the exhibitions "Software, Information, Technology" at the Jewish Museum in 1970 and "Art and Technology" at the Los Angeles County Museum in 1971). Later, the proliferation of digital methods in the 1980s created an explosion in the art and technology movement.

Despite this, the separation of the arts in education continues and many scientific, technological and business communities today scarcely allow the integration of art, mirroring a general cultural bias towards what is often seen as fringe. But that is changing.



Julie Harrison, *If It Rained Here,* 1997, digital ink-jet prints, text by Joe Elliot, published as a limited-edition book by Granary Books.

Stevens' new Department of Art, Music & Technology is dedicated to the study and practice of art and its particular relationship to science and technology. The program will draw upon both traditional and new art forms, offering the student a broad foundation in technical skills while encouraging experimentation with new ideas, genres, and models. Interdisciplinary investigation and learning across the humanities as well as interdependence and collaboration between artist & scientist, artist & engineer, will make it a transcultural and transpedegogical experience. While aesthetic criteria will prevail, we will foster practical experience with internships and work in the professional arena through our visiting artists program and partnering organizations in New York City. The Bachelor of Arts or Bachelor of Science degree in Art & Technology will provide a rigorous background which will enable the student to pursue further education, training and professional placement in the field while preparing them to be visually literate and well-versed in technical, critical and conceptual skills.

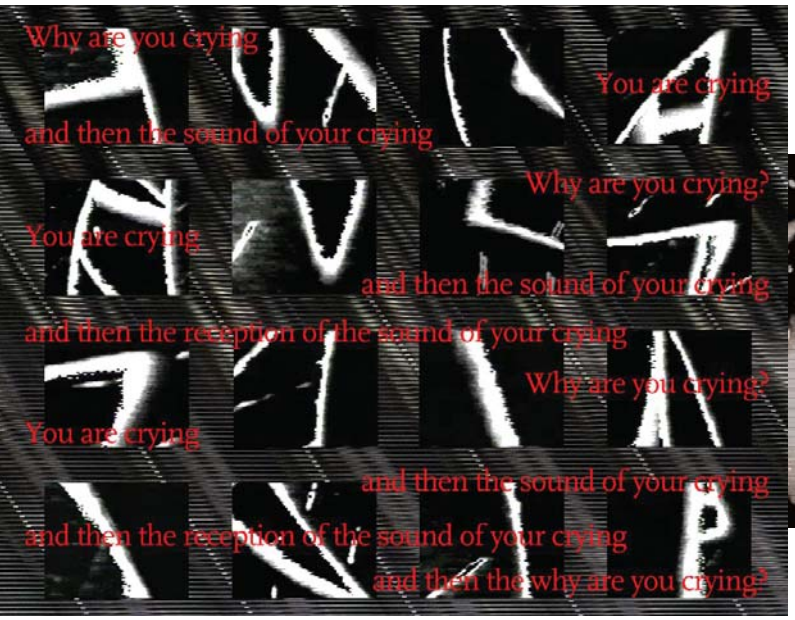
Studio courses will eventually include: Digital Imaging, Drawing, Video, Net Art, Robotic Ideas and Applications, History of Art & Technology, Animation, Holography, Interactive Installation, History of the Moving Image, among others.

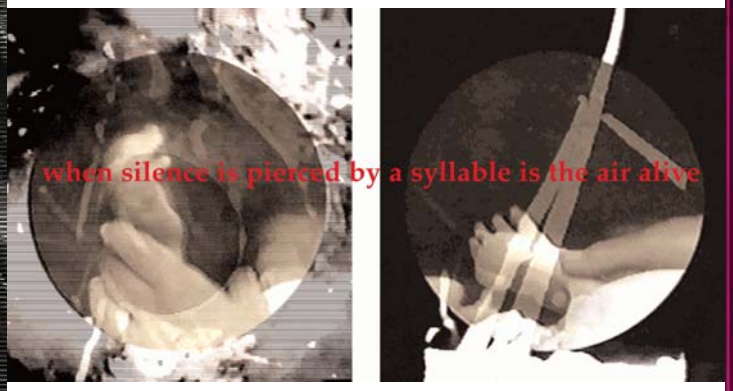
Art & Technology faculty members will be multidisciplinary and actively disseminate the results of their creative and scholarly work. In practice and in teaching, the faculty will represent a diversity of approaches and philosophies. Every semester, leading artists in their field will be invited to work with our students. This aspect of the program will enable students to go deeper into an area of interest, collaborate with the most cutting-edge practitioners, and become involved with professionals as life-long mentors.

The Department of Art, Music & Technology will utilize studios, classrooms, labs, galleries and performance spaces at Stevens Institute of Technology and in partnership with

Top: *Principles In Form & Design* class at Stevens, taught by **Julie Harrison**.

Left: **Judy Ng,** *Cultural Identity,* 2004, digital print, for Art & Technology class.





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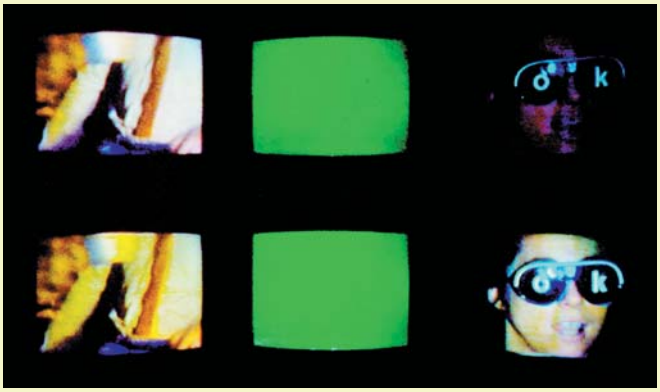
various institutions in New York City. We hope to eventually build a complex to house our new program at Stevens.

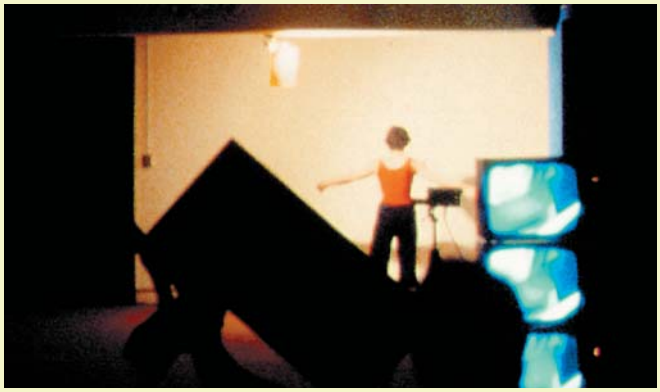
Is this dreaming? Of course it is, but by providing new majors in both art and music technology, we will attract pioneering artists who have the vision to create with materials not always associated with art — robotics, telecommunications, genetics, artificial intelligence, virtual reality, nanotechnology, cybernetic body modification, and lasers, among others. This is in addition to the now "traditional" media of computers and video. Invoking the memory of Billy Klüver (who sadly passed away in January 2004), and our ingenious alum, Alexander Calder, we will provide a place of cooperation and experimentation, opening the doors to knowledge across the boundaries of disciplines and learning from one another.

My early work with video in the mid-1970s as an undergraduate art student at the University of New Mexico — at a time when few academic institutions supported it (or even knew about its evolution) — forced me to seek guidance from other departments in the School of Fine Arts, notably the dance department, which nurtured my yearnings to break down the boundaries of two and three-dimensional space in art, only theretofore academically recognized by more "time-based" disciplines.

In my trek across campus this year to learn more about Stevens and to discuss with others what kinds of equipment could be shared and courses jointly taught, I have garnered



Julie Harrison, *One Life to Live,* 1981, 6-monitor video installation, The Bank Intermedia, Amsterdam, Holland.



Julie Harrison, *Ellipsis,* 1978, a performance in collaboration with Cara Brownell and Chana Gazit, at the Experimental Television Center, Binghamton, NY, including interaction between 4 dancers, 3 video cameras, and prerecorded videotapes sequenced/switched to 7 monitors.

Julie Harrison, *Debtor's Prison,* 2001,
in collaboration with writer Lewis Warsh.

(including insets)

photographs, published as a trade book by Granary Books.

an enthusiastic response from faculty members in various areas. Professors in the Departments of Computer Science and Materials Engineering have invited me to use their labs for my own artistic experimentation. Like Bell Labs and E.A.T. before me, I hope to provide an active forum for this kind of exchange at Stevens.

Prior to becoming the Artist-in-Residence at Stevens last fall, I was an adjunct for nine years. In addition to teaching two courses, Art & Technology and Contemporary Art, I created and maintain a student art gallery on the Internet (www.stevens.edu/gallery/), providing a showcase for student work. Another virtual gallery has recently been added to exhibit the artwork of alumni, faculty and staff. As most educators know, the potential and rewards of teaching are vast, but part-time compensation does not allow for the kind of involvement I've enjoyed this year.

...like many cutting-edge technologies, having a Department of Art, Music & Technology at Stevens will become a model which other institutions might follow.

The major fundraising effort essential to realizing this program has already begun. Art & Technology majors can feel confident that what we offer in the fall of 2004 will blossom, and like many cutting-edge technologies, having a Department of Art, Music & Technology at Stevens Institute will become a model which other institutions might follow. It is a step into the future as we acknowledge the rich history exemplified by E.A.T. and the Pepsi Pavilion. ■