

## Media Laboratory

This year the Media Lab welcomed a new director, Frank Moss, a seasoned entrepreneur and technology expert who has spent the past 25 years building a diverse set of companies that are on the leading edge of technology. In assuming leadership of the lab, Moss is emphasizing a new model for academic/industrial interaction, with the lab pioneering innovative ways to connect its highly creative, nonlinear thinking with the realities of the business world—a model that should forge new alliances and give sponsors maximum value.

Toward this end, Moss has identified three key challenges: (1) to provide value to sponsors in ways that reflect the changes in the world economy and the changes in sponsors' economic models for innovation; (2) to identify new themes for the lab's research agenda, themes that will help increase human capability and blur the boundaries among the human, virtual, and physical worlds; and (3) to foster a new spirit of collaboration—both internally at the lab and externally with other researchers at MIT and sponsoring companies—to create longer term, multidisciplinary projects that will affect society through improvements in health care, education, and the creative process. From “smart” prostheses to huggable robots to stackable city cars, the Media Lab is looking to help create a future in which we are learning beyond schools, managing health beyond hospitals, and innovating beyond institutions.

### One Laptop per Child

With Moss's appointment, Media Lab cofounder Nicholas Negroponte will step down as chairman to concentrate on One Laptop per Child, an independent nonprofit organization he launched in January 2005 to develop a very-low-cost laptop for the world's children, especially those in developing nations. Walter Bender, a founding member of the Media Lab who served as lab director for the past five years, has taken a leave of absence from MIT to serve as One Laptop per Child's president for software and content development. The Media Lab expects that the low-cost laptop will provide an innovative new platform through which new technologies from the lab can reach a global population.

### Research Achievements

A sampling of 2005–2006 Media Laboratory research initiatives includes:

- *Biohybrid prosthetic limbs* that will perform like biological ones, with active knees and ankles controlled by an amputee's own nervous system and powered by muscle-like devices so that they can generate the mechanical force needed to walk and climb without falls or fatigue.
- *Appealing sociable robots* that can physically interact, communicate with and learn from people in familiar human-oriented terms. One robot, Leonardo, <http://robotic.media.mit.edu/projects/Leonardo/Leo-intro.html>, (a collaboration with Stan Winston Studio, <http://www.stanwinston.com/>), seamlessly merges the artistry of character, robotic technology, and artificial intelligence.

- The *Human Speechome Project*, an ambitious attempt to unravel the mystery of how humans naturally acquire language within the context of their primary social setting by studying one child, from birth to age 3, for nearly all of his waking hours. The project will yield some 400,000 hours of audio and video data that will be stored in a massive petabyte (1 million gigabyte) disk storage system.
- *Scratch*, a new programming toolkit that makes it easier for kids to manipulate graphics, images, and sounds to create animated stories, video games, and interactive art. Just as children can build physical structures with LEGO, they can “construct” computer creations with Scratch.
- *PICO*, an interactive tabletop workspace that can take much of the guesswork out of “what if” scenarios. By projecting graphic representations of complex computations directly onto the surface of a table, PICO combines the quantitative strengths of computers with human experience and intuition.
- *Hyperscore*, a musical composition tool that converts visual information into music, allowing children to compose original scores by drawing lines and using colors. Through a sponsor collaboration, a simplified version of this technology is available to children through Fisher-Price’s Symphony Painter music cartridge for its Pixter Color.
- *City Car*, a stackable, electric, two-passenger city vehicle that will create an urban transportation network that takes advantage of existing infrastructure, such as subway and bus lines, to change the way we design and live in dense urban areas.
- A wireless *RFID (radio frequency identification) wristband* that unobtrusively senses a user’s focus of attention and offers information and services based on this perception.
- Hardware and software *tools that allow computers to become “socially aware”*—able to assess human interest, attention, and desire. This allows the customization of interactive media to users’ desires and to different social situations.
- *DishMaker*, a variable molding machine that brings personal fabrication into the kitchen, allowing people to create and recycle dishes on demand.
- *Pushpin Computing*, a network of small, bottlecap-sized mini-processors, each with two thumbtack-like pins that connect to a power-supplying “bulletin board” to provide a real-world testbed for tomorrow’s extremely high-density sensor networks.
- *Affective learning companions* that will act as intelligent tutors, virtual peers, or a group of virtual friends to help facilitate learning, creativity, and motivation.

For a complete list of Media Lab projects, visit <http://www.media.mit.edu/research/samples.html>.

## In Memory

On February 28, 2006, the Media Lab lost a great friend and colleague with the passing of Pushpinder Singh, a postdoctoral fellow at the lab. Singh, who came to the Media Lab as an undergraduate researcher, earned his SB and MEng degrees in 1998 and his PhD in 2005, all from MIT’s Department of Electrical Engineering and Computer Science. He had accepted a faculty appointment set to begin in September 2007. Singh worked closely with Marvin Minsky and others in the lab to pioneer humanlike

common sense for computers and was known to the world for his unique intellect and his groundbreaking research in opening the possibility for a true partnership between people and machines. To honor Singh, the Media Lab has established the Push Singh Memorial Fund. This endowed fund will be used in perpetuity to support the research activities of both undergraduate and graduate students at the lab.

## Exhibitions and Performances

John Maeda's first solo exhibit at the Fondation Cartier pour l'art contemporain in Paris in November attracted a record 1,800 visitors. Tod Machover and Neil Gershenfeld were among the "40 Modern-Day Leonardos" selected by Chicago's Museum of Science and Industry as part of its 2006 exhibit *Leonardo da Vinci: Man, Inventor, Genius*. Machover also premiered two new compositions in 2006: "Another Life" in March and ". . . but not simpler . . .," an acoustic work commissioned by the Ying Quartet, in April. Machover, recent graduate (and Hyperscore creator) Mary Farbood, professor emeritus Marvin Minsky, and U2's the Edge were judges for a ringtone music composition contest held on campus in January. The entire MIT community was invited to create mini-compositions for cell phones using the Lab's Hyperscore technology. The contest attracted approximately 100 submissions.

## Collaborations

The Media Lab's research agenda is synergistic with work going on across the MIT campus and involves numerous interdisciplinary collaborations, particularly with researchers in brain and cognitive sciences, bioengineering, management, mechanical engineering, computer science, artificial intelligence, and urban planning. These collaborations are in the form of joint academic appointments, teaching efforts, and research programs. Fifteen of the lab's graduate students and all of our approximately 200 Undergraduate Research Opportunity Program students are enrolled in degree programs outside the lab's academic program in Media Arts and Sciences (MAS). In addition, 12 students are enrolled in the alternative freshman-year program, which completed its seventh year.

Taiwan's Industrial Technology Research Institute and the Media Lab are collaborating on NEXT, a consortium that explores new approaches to innovation. Members include commercial enterprises, research organizations, and governments.

The lab hosted the International Institute of Electrical and Electronics Engineers' workshop on wearable and implantable body sensor networks in April. Approximately 200 attendees heard presentations from more than 50 researchers in the areas of computing, electronics, bioengineering, and medicine. Associate professor Joseph Paradiso, Sony Corporation career development professor of media arts and sciences, cochaired the event with Guang-Zhong Yang of Imperial College.

The Media Lab and the Berkman Center for Internet and Society at Harvard Law School cohosted the Identity Mashup Conference from June 19–21. The conference explored the role of identity management systems in furthering or inhibiting privacy, civil liberties, e-commerce, and new forms of civic participation.

## Sponsors

The Media Lab welcomed 11 new sponsors for FY2006:

- Avaya
- Bradesco Foundation
- Campbell Soup Company
- Marvell
- The MITRE Corporation
- NEC Corporation
- PepsiCo
- Schneider Automation
- Tele Atlas
- Telecom Italia
- Toyota Motor Corporation

## Fellows

Twelve corporate sponsors funded student fellows: AOL, France Telecom/Orange, Highlands and Islands Enterprise, Johnson & Johnson Services, LEGO, Motorola, NEXT, Nortel, PepsiCo, SAIC, Samsung, and Telmex. Additional sponsors included the family and friends of the late Steven R. Holtzman, who established an endowed fellowship in his memory. The following were named fellows during FY2006:

- Hugo Liu (AOL)
- Bo Morgan and Ryan Aylward (France Telecom/Orange)
- Amber Frid-Jimenez (Steven R. Holtzman Fellowship for Digital Expression)
- Anmol Madan and Elisabeth Sylvan (Highlands and Islands Enterprise)
- Philip DeCamp (Johnson & Johnson Services)
- Annie Ding, Hayes Raffle, and Oren Zuckerman (LEGO)
- Fulu Li and David Merrill (Motorola)
- Roberto Aimi, Ryan Chin, Cory Kidd, Jackie Lee, Vincent Leclerc, Seth Raphaël, Edward Shen, James Teng, Noah Vawter, and Scotty Vercoe (NEXT)
- Grace Woo (Nortel)
- Mateusz Malinowski (PepsiCo)
- Aaron Zinman (SAIC)
- Jesse Gray, Ishwinder Kaur, Daniel Kim, Durga Pandey, and Richard Whitney (Samsung)

- Ernesto Arroyo, Gerardo Barroeta Perez, Andres Monroy Hernandez, Ernesto Martinez-Villalpando, Emmanuel Munguia Tapia, Daniel Olguin Olguin, and Hector Yuen (Telmex)

### **Directed Research Sponsors**

In FY2006 the Media Lab submitted 29 proposals for new and continuing directed research projects. Twelve of these proposals remain under consideration, and 12 have resulted in awards. Nearly 70 percent of the proposals submitted were in response to government solicitations (National Science Foundation, Defense Advanced Research Projects Agency, Department of Defense, Department of Homeland Security, and National Institutes of Health), and there was additional interest in directed sponsorships on the part of foundations and nongovernmental sources. The proposals ranged in size from \$15,000 to \$2.25 million and spanned one to three years; grants that were awarded ranged from \$15,000 to \$750,000, with an average award of \$240,000 per year for 1.5 years.

### **Human Resources/Administration**

The Media Lab's new director, Frank Moss, was also appointed professor of the practice and holds the Jerome B. Wiesner chair in media technology. In these positions, he will oversee the Media Lab's growth and expansion as it pursues new directions in research and enhances its sponsor collaborations. Kenneth Goldsmith, who had served as assistant director of finance and space for MIT's Division of Student Life, joined the lab as director of finance in May. In addition, the lab is pleased to announce two promotions: research scientist Henry Holtzman, who coheads the lab's Physical Language Workshop, was named the lab's first chief knowledge officer, and Jon Ferguson has taken over the position of director of the lab's Network and Computing Systems group.

**Frank Moss**

**Director**

**Professor of the Practice of Media Arts and Sciences**

**Jerome B. Wiesner Professorship of Media Technology**

*More information on the Media Laboratory can be found at <http://www.media.mit.edu/>.*

## Media Laboratory Sponsors

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\*Members of all consortia and special interest groups, with resident researchers

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