



Volume 49 – Number 16  
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# TechTalk

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## RESEARCH

### WORKHORSE GETS BOOST

Design changes to an engine commonly used to power factories and HVAC in residential buildings will result in increased fuel efficiency and reduced emissions, according to a team of MIT researchers.

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### NEW KIND OF CITY EMERGING

Cities of the next century will be radically unlike cities of the past, say a group of architects, planners and others who convened at MIT.

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## NEWS

### REMEMBERING A FRIEND

Hundreds of current and former residents of Senior House and East Campus gathered on Jan. 21 to remember night watchman James Roberts, who died last month. Plenty of food, stories and laughter marked the occasion.

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### MCNAIR CHAIR ESTABLISHED

To honor the memory of alumnus Ronald E. McNair, one of the astronauts killed in the explosion of the Challenger space shuttle on Jan. 28, 1986, NASA and MIT have established the Ronald E. McNair-NASA Visiting Professorship in Astronautics.

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### BURCHARD SCHOLARS SELECTED

The School of Humanities, Arts and Social Sciences has identified 30 sophomores and juniors as Burchard Scholars. The awards are given to students who demonstrate unusual abilities and academic excellence in the areas embraced by the school.

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### RIDING FOR RESEARCH

A student team gets the nod from NASA for a ride in its Weightless Wonder. The students will purify water using electricity fields.

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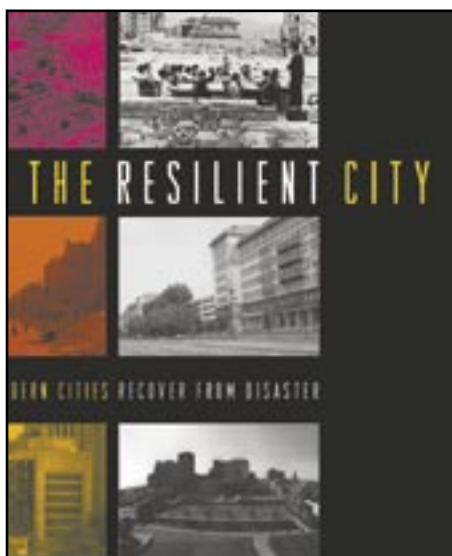
## ARTS

### A COMPOSER'S BIG BANG

MIT alumna Christine Southworth premieres "Zap!" a composition for human musicians, robots and the 40-foot-tall Van de Graaff generator at Boston's Museum of Science.

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## FEATURED STORY



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# IAP course diversity intact

The Independent Activities Period (IAP), MIT's special January term, offers students, faculty and staff the opportunity to take or teach classes in areas they might not normally have time to explore, such as playwriting, holography, weather forecasting or integrated chemical engineering. Some of these classes are for non-credit activities, others are for-credit courses.

Even the blizzard the weekend of Jan. 22 didn't stop the 36th IAP. Only a few classes reported cancellations, according to Michael Bergren, assistant dean of academic and research initiatives. This year, there were 680 non-credit activities offered during IAP, more than in past years, and close to 100 for-credit courses.

News Office reporters and photographers offer an IAP sampler that begins with the story below and continues on pages 4 and 5.



PHOTO / DONNA COVENEY

IAP was largely a snowy affair this year, as shown by the snow piles around the columns on the porch off Lobby 10.

## Meteorologist thrills to the hazards of blizzards

Sasha Brown  
News Office

While many hunkered down in their warm homes during the blizzard of 2005, Channel 4 meteorologist Mish Michaels was racing to Cape Cod to stand in the heart of it.

"This is what you hope for. This is a moment that logs in your brain, a moment where time stops," Michaels told a room full of students in the IAP course "Intro to Weather Forecasting," offered each January by Lodovica Illari, a lecturer in the Department of Earth, Atmospheric and Planetary Sciences.

### RELATED STORIES

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Michaels spent most of the blizzard in a hotel in Chatham, Mass. She shared some of her wind-whipped weather reports with the class. As the students laughed at clips of her being blown around by wind gusts of up to 87 mph, Michaels' quipped, "These are the

markings of a meteorologist's life."

During her hour-and-a-half talk, Michaels explained what it takes to be a good meteorologist. "You have to develop a thick skin. You are never going to be right all the time," she said.

She stressed the importance of education and training, and expressed frustration with the untrained TV forecasters out there. "It is a bit frustrating for the rest of us who sweated through Fluid Dynamics," said Michaels, who holds a bachelor's degree in meteorology from Cornell University.

During her more than 10 years in the Boston area, Michaels

has found forecasting the region to be a welcome challenge. A rapid deepening of storm systems called "bombogenesis"—an effect seen in only one other region of the world, off the coast of Japan—and snow squalls are just two of the patterns that make New England weather difficult and exciting. "New England is the best. I have had many offers to go elsewhere, but I am here to stay," she said.

## Letter from Sri Lanka

*Former postdoctoral associate Sanith Wijesinghe (Ph.D. 2003) is from Colombo, Sri Lanka, about 15 miles from the coast where the tsunami hit. Wijesinghe traveled to his homeland on Jan. 6 to help with relief efforts. This is the first of several reports he hopes to send to the News Office.*

On Jan. 14, I headed to Trincomalee to help set up a medical field office in a refugee camp. The trip was coordinated with the help of the local Lion's organization and the Sri Lankan navy. Trincomalee, located on the northeastern coast of Sri Lanka, was one of the first locations to be hit by the tsunami.

On arrival we saw overturned fishing boats and bricks littered everywhere along the roads. Beach front property was completely devastated. Trincomalee beach was eerily quiet; it felt like we were walking through a ghost town.

We spoke with the owners of a guest house along the beach, who said the first wave arrived around 8.30 a.m. It flooded the first story of the buildings and washed away all unsecured furniture, clothes, books ... everything. As this wave receded it left a quarter mile of seabed exposed and people gathered to investigate the unusual emptiness of the sea. Within a few minutes a

second stronger wave, about 10 meters high, raced towards the beach and caught everyone by surprise. A quiet Sunday morning was transformed instantly into a horrific massacre.

As we headed north towards the refugee camp, we passed the popular tourist destination of Nilaveli beach. The famous hotel was gutted. Coconut trees and mangroves were dead or dying. It seemed like a huge fire had scorched the land. Buildings half a mile up the beach were destroyed.

Remarkably, a Hindu temple on the beach remained standing. Its exposed foundations indicated two to three feet of sand erosion. I took a picture of a small statue of the Hindu Lord Ganesh that had washed up. People had lighted incense sticks around it and were praying.

We set up our medical field office in a refugee camp in Kudurupitti, on the northern outskirts of Trincomalee, with four doctors and four nurses. We treated 270 patients. A team of Indian navy doctors stopped by and provided additional medical supplies.



Sanith Wijesinghe

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## Tropical seesaw: flooded Amazon means drought in Congo

Cathryn M. Delude  
News Office Correspondent

When the Pacific talks, the global climate listens in the phenomenon known as the El Nino southern oscillation that receives ample scrutiny by researchers and rapt attention from the public. Now MIT scientists have learned that a similar climatic conversation occurs between the world's two largest tropical river basins: the Amazon in South America and the Congo in Africa.

When the Amazon river basin floods, the Congo basin dries up, and vice versa. MIT Professor of Civil and Environmental Engineering Elfatih A. B. Eltahir calls this previously undocumented pattern a seesaw oscillation. He and his research team described their discovery in the December 2004 issue of Geophysical Research Letters.

"It's important, because it tells us about a phenomenon involving the

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# Tsunami puts book and its editors in demand

Patti Richards  
News Office

With the country still reeling from the Sept. 11 terrorist attacks, Professor Lawrence J. Vale and his colleagues in the Department of Urban Studies and Planning convened a major colloquium in the spring of 2002 to look at how modern cities recover from disasters.

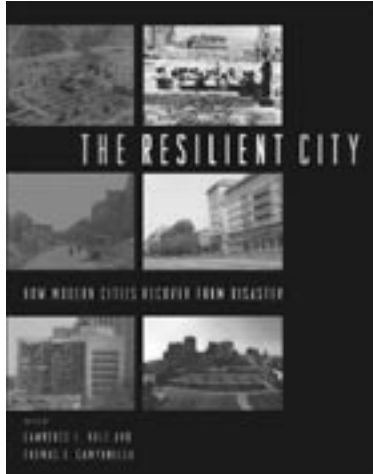
The colloquium ran for several weeks and featured lectures and seminars by urban planners, writers and historians. Its focus was not only on the nuts and bolts of disaster recovery, but on the broad concept of urban resilience—on how cities manage to persevere through even the most catastrophic events.

The project was intended to produce a book, which Vale and co-editor Thomas J. Campanella, formerly of MIT and now at the University of North Carolina, spent the past few years putting together. As fate would have it, the book's publication date coincided with another monumental tragedy, the tsunami in South Asia.

Vale and Campanella suddenly found themselves much in demand on the news media circuit. Their book, "The Resilient City: How Modern Cities Recover from Disaster"

(Oxford University Press), became a resource as people struggled to make sense of the tsunami.

But is there really a connection between, say, the Chicago fire of 1871 or the civil war in Beirut and the giant waves that washed away the beaches of several Indian Ocean countries?



"I think the book applies both narrowly to the traumas of particular cities, but more broadly to questions about priority-setting," Vale said.

"Who chooses which places to rebuild first? What does this tell us about the power structure of the country that has been devastated? How is the built environment used to symbolize key moments of resilience?" he

asks.

As many of the essays in the book indicate, there are certain predictable patterns of rescue, restoration, rebuilding and remembrance that are common to any major disaster. But it is the variations to these patterns that bear further examination, and each essay tells a unique and compelling story.

According to Vale, most survivors of major disasters, at least those spared a loss of family members, seem to find ways to partake in a progress-oriented view of a disaster's aftermath, focusing on opportunities to improve conditions over what had prevailed prior to the catastrophe. But despite the fact that some progress always does get catalyzed by disaster, "resilience often entails bouncing back to the profoundly unequal conditions that prevailed before the sudden traumatic change occurred," said Vale.

Probably the biggest priority competing with the wish to aid survivors—at least in southern Thailand and Sri Lanka—is the wish to restore confidence to the tourism industry. And this in itself "will be a promoter of forward-looking and optimistic kinds of scenarios, especially with something like a tsunami that no one expects to happen again in that place anytime soon," Vale said.

# Subtle changes will make workhorse engine cleaner

Nancy Stauffer  
Laboratory for Energy and the Environment

Design changes to an engine commonly used to power factories and residential buildings will result in increased fuel efficiency and reduced emissions, according to a team of MIT researchers.

Using a new computer model and experiments in a full-scale engine, the researchers identified subtle design changes that can reduce friction in a type of large, natural gas-fired engine capable of providing electricity to a large building. Given the widespread use and continuous operation of this type of engine, the researchers anticipate significant fuel savings and emissions reductions.

The natural gas-fired reciprocating engine is a large, reliable, rugged engine ideal for small-scale power generation. A single unit can power a factory or provide both electricity and heat to an apartment complex.

"These engines generally run continuously, so making them more efficient will save a lot of fuel over time," said Victor W. Wong, a principal research scientist at MIT and lecturer in the Department of Mechanical Engineering. Wong and col-

leagues in the Sloan Automotive Laboratory and the Laboratory for Energy and the Environment have been focusing on improving the efficiency of several different types of engines.

In a natural gas-fired reciprocating engine, less than 40 percent of the energy in the fuel ends up as electricity, in part because friction reduces efficiency. As with a car engine, the natural gas-fired engine contains a series of cylinders, each housing a piston that moves up and down. Three metal rings mounted in grooves around the piston slide along a film of lubricating oil on the cylinder wall as the piston moves.

The MIT team examined the individual components, how they fit together, and how they behave and interact when the engine is running. But just determining friction is not enough. "We have to make sure that we don't simultaneously increase emissions or oil consumption or wear on the engine," said Wong. "That means we have to look at the detailed characteristics of the surfaces, including submicron peaks and valleys on the piston and rings."

Such details are included in the computer model formulated by Wong, Tian Tian, Professor John B. Heywood, Ertan Yilmaz (MIT Ph.D. 2004), Grant Smedley

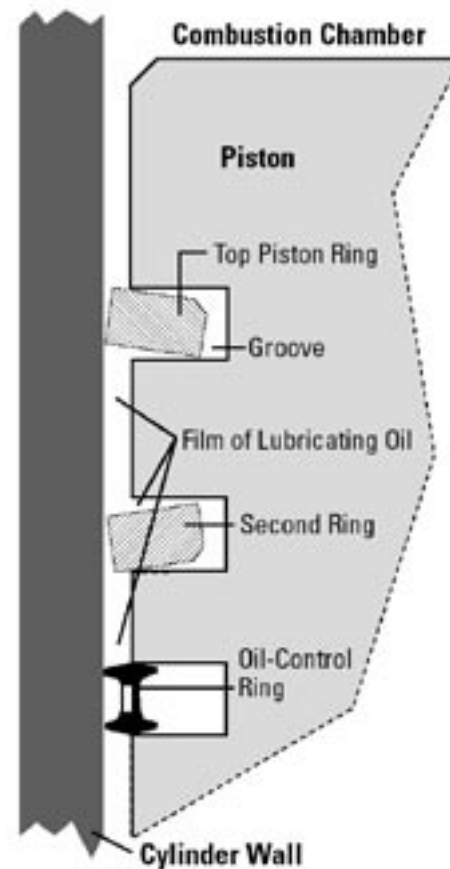
(MIT S.M. 2004), and graduate student Jeffrey Jocsak.

Guided by the model, the researchers identified key sources of ring-related friction and defined three design modifications that might help. They changed the shape and tilt of the top ring and reduced the outward springiness of the oil-control ring.

To validate their model and its findings, the researchers turned to collaborators at Colorado State University, who operate a huge test facility for large stationary engines. To measure the effects of the proposed design changes, the Colorado researchers ran tests using rings and other components made according to MIT's specifications. The analytical results were comparable to the measurements taken in the experimental engine.

The computer model suggests that making all three changes at once would improve overall fuel economy by about five percent. "That's by no means a negligible gain," said Wong. "It'll result in significant fuel savings and a substantial reduction in emissions over the life of the engine."

This research is supported by the U.S. Department of Energy.



# SEESAW

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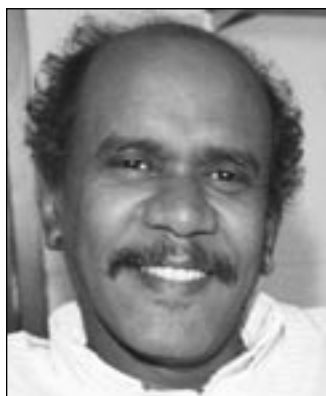
two largest rivers and their natural variability," Eltahir said. "The possible implications are that we could identify precursors of climate conditions that would improve the predictability of floods and droughts in the tropics." The study has social as well as scientific relevance, since the ups and downs of rainfall in these regions can mean feast or famine for the inhabitants.

Eltahir specializes in hydroclimatology, the two-way street connecting events in the water cycle, such as evaporation and the convection of moist air, with climate conditions, such as rainfall systems. As he explains, the world has three main rainfall centers where intense storms with a global reach originate: the Western Pacific Ocean, the Amazon River basin and the Congo River basin. The two land-based rainfall centers also host the world's first

and second largest rivers, respectively.

In spite of this important status among rainfall centers, scientists had collected little data on actual rainfall patterns in the Amazon and Congo, partially because of the areas' remoteness. Then in 1997, NASA started the Tropical Rainfall Measuring Mission to collect satellite data over the tropics, but no one had analyzed the data for the Amazon and Congo basins.

Eltahir asked undergraduate Teresa K. Yamana to look at the data for those basins for the years 1998 to 2002. In the resulting graph, the lines for the two regions formed mirror images—



Elfatih A. B. Eltahir

high rainfall for the Amazon/low rainfall for the Congo—that looked like a seesaw. The observation held true when put to additional scientific and statistical scrutiny by Eltahir.

To find out if the pattern also occurred over the long term, Eltahir asked graduate student Brian Loux (an undergraduate at the time) to analyze older data of a different type. Between 1905 and 1985, scientists had tracked the river flow of both the Amazon and Congo. Because the rivers drain the entire watershed basins of the two rainfall centers, their flows serve as surrogates for regional rainfall. Again, the analysis generated graphs that reflect a similar oscillation between flood and drought in the

two regions, most dramatically during the southern hemisphere's rainy season: February, March and April.

"It looks somewhat obvious after you discover it," Eltahir said. "But nobody looked at the data before." Ph.D. candidate Arne Bombly helped pull together the final analyses and paper.

"We tested the seesaw hypothesis using two independent sources of information," Eltahir said.

"In the future, I'm interested in studying the physical mechanism behind this phenomenon and the extent of its global impact," he continued. "I hope to develop atmospheric models that describe the circulation in and around the two areas and globally. We could learn about precursors to climate conditions and be better prepared to handle the practical problems arising from severe hydrologic conditions."

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# Campus pays tribute to night watchman

Sasha Brown  
News Office

To the thousands of MIT students who knew him, James E. Roberts Sr. was much more than the night watchman at East Campus and Senior House for the past 20 years. He was "Big Jimmy," a friend and surrogate father.

Tuesday evening, Jan. 25, hundreds of students came to Senior House to pay their respects to Roberts, who died Jan. 21.

"Everybody knew him. There will never be another like him," said Mary Kathryn Thompson (S.B. 2002), a graduate student who came to know Roberts through her many friends living in East Campus and Senior House. Thompson organized the Jan. 25 wake.

Known for his ever-present smile and generous nature, Roberts worked hard for the students in his building. "He knew it was important to be visible around the dorm and get to know all the students. A feeling for what is going on around the place doesn't come to you, you have to go seek it out," said Senior House graduate resident tutor, Andrew Brooks.

Roberts often provided pizza, ice cream, Italian ices, burritos and pot-pies for late night studiers. The food consumed during those sessions came to be affectionately known as "Jimmy food."

One student favorite was "Jimmy chili," a special chili he brought from home in a massive pot. "Some people survived on Jimmy chili," said Thompson, who arranged for the six pots of chili at Jimmy's wake. She and dozens of others spent the night before the wake baking and

cooking. All told, there were 27 pans of lasagna, hundreds of cookies, and, of course, chili.

"It seemed to be a fitting tribute," said Media Lab graduate student Joshua Lifton who was a graduate resident tutor (GRT) at Senior House and, this week, created a web site dedicated to Roberts. "Whether you were working all night on a problem set, doing your laundry, or spray painting your latest art project, Jimmy never failed to brighten your day."

The wake immediately followed Roberts' funeral, which was held in Somerville. Hundreds of students flooded in during the visiting hours at the Doherty Funeral Home, where they met Roberts' family. He is survived by his mother Emily Preble of Brockton; his children, James Jr. and Kim Roberts both of Arizona; two sisters, Joann Young-Haddad of Dorchester and Jean McKenzie of Fall River; six grandchildren; and many nieces and nephews.

Later, the family and Roberts' best friend, Timothy Moore, and Moore's wife also came to the Senior House



James Roberts Sr.

wake, where they spent the evening swapping stories about the man who had such a large impact on so many students.

"They seemed to really appreciate getting a feel for the atmosphere Jimmy worked in and contributed so much to," said Thompson. "They knew how important we were to Jimmy and vice versa, but seeing it expressed all at once was almost overwhelming."

Director of Housing Karen A. Nilsson said she was constantly impressed by Roberts' dedication to his work during a difficult shift from midnight to 8 a.m. "He always went that extra step," she said recalling the times Roberts would take a day out of his personal vacation time to help the students in Senior House during their annual spring steer roast. "He just always gave more than 100 percent."

In 1991, Roberts was honored with a James N. Murphy Award, given annually to a member of the MIT community for their outstanding contributions to the MIT community. "Big Jimmy serves as protector, physician, counselor and parent to MIT students in their hours of greatest need," said the nominators. When Roberts stood to receive his award, he received a standing ovation.

"Jimmy was probably the best person I ever met at MIT," said Ariel Segall (S.B. 2004). "He'd keep track of the people who needed to be checked up on, and go out of his way to make sure he knew they were okay every night. He saved lives that way. Most night watchmen think their job is to guard student's bodies. Jimmy guarded our hearts, minds and souls, too."

In lieu of flowers, the family requests that donations be made in Roberts' memory to the MIT Scholarship Fund (Room E19-411).

## Professorship honors Challenger astronaut McNair

To honor the memory of MIT alumnus Ronald E. McNair, an astronaut who was killed in the tragic explosion of the Challenger space shuttle on Jan. 28, 1986, NASA and MIT have established a teaching and research position in his name.

The Ronald E. McNair-NASA Visiting Professorship in Astronautics at MIT builds on a long tradition of cooperation between NASA and MIT.

"MIT has always been key to NASA's success. Our people, technology development and scientific investigations have been intertwined since the earliest days of the space program," said William

Readdy, NASA associate administrator for space operations.

MIT's Department of Aeronautics and Astronautics has two former astronauts on its faculty—professors Laurence Young and Joseph Hoffman—and works closely with NASA on many research projects. The Institute has 33 alumni from many different departments who have become astronauts—more than any other non-military institution in the U.S. Those alumni have flown in more than one-third of the nation's space flights.

The professorship will be a rotating position for a NASA scientist or engineer to teach and con-

duct research for at least a year in the Department of Aeronautics and Astronautics. Funding for the professorship will come both from NASA and MIT, and the institutions will work together to select candidates for the position.

"Reggie, Joy and I are elated to hear about the creation of the Dr. Ronald E. McNair-NASA Visiting Professorship by two great institutions he was devoted to," said McNair's widow, Cheryl McNair, on behalf of the couple's two children.

MIT's Building 37, which houses the aeronautics and astronautics department, was renamed the McNair Building following the

Challenger's explosion. The space shuttle had just launched when it exploded in air, killing McNair and his six crewmates: Francis R. Scobee, Michael J. Smith, Judith A. Resnik, Ellison S. Onizuka, Gregory B. Jarvis and S. Christa McAuliffe.

McNair earned his doctorate in physics from MIT in 1976, doing early developmental work on high-pressure lasers. He first flew on the Challenger in 1984. He was the first person to operate the shuttle's robotic arm, using it to position a fellow crewmember during a spacewalk. His next mission aboard Challenger ended tragically.



Ronald McNair

## Burchard Scholars announced

The School of Humanities, Arts and Social Sciences has named 30 sophomores and juniors Burchard Scholars for 2005.

The awards, named after the school's first dean, John Ely Burchard, are given to students who demonstrate unusual abilities and academic excellence in the areas embraced by the school. According to Dean Philip S. Khoury, co-founder of the Burchard Program and chair of the selection committee, the students selected in the 19th year of competition for the awards are a "remarkable group of gifted young scholars from diverse backgrounds."

Burchard Scholars will be invited to a series of dinners with a rotating group of faculty beginning in February. At each dinner, an MIT faculty member or visiting scholar will present work in progress, followed by a discussion to provide students with the opportunity to engage in the

kind of intellectual exchange that characterizes scholarship in the humanities, arts and social sciences. The emphasis throughout the program will be interdisciplinary. Professor Stephen Meyer of political science directs the Burchard Scholars Program.

The new Burchard Scholars are juniors Leila Agha, Anna Bershteyn, Molly Bright, Lydia Chilton, Elizabeth Farrelly, Emily Fenn, David Glasser, Jonathan Harris, Neera Jain, Brian Keegan, Ingrid Lawhorn, Wen Li, Jolinta Lin, Heather Phipps, Adjoa Poku, Eleanor Pritchard, Jonathan Reinharth, Jessica Rhee, Philip Richerme, Frances Roberts, Christopher Suarez, Jeanette Tse and Dan Wheeler.

Sophomores selected as Burchard Scholars are Louis Fouché, Charles Jernigan, Cynthia Lin, Mitra Lohraspour, Christine McEvilly, Ruth Miller and Ashley Tran.

## Students will ride aboard NASA's Weightless Wonder

Four students from MIT have been chosen by NASA to conduct research while floating aboard the agency's famous "Weightless Wonder" aircraft. The selected students are Ryan Damico (a senior in electrical engineering and computer science), Adam Shabshelowitz (a junior in aeronautical and astronautical engineering), Jeremy Conrad (a junior in mechanical engineering) and freshman Peter Lai.

Each year, the Reduced Gravity Student Flight Opportunities Program at NASA's Johnson Space Center in Houston gives undergraduate student teams the opportunity to research, design, fabricate, fly and evaluate a reduced gravity experiment. The student teams follow much the same path as scientists who develop experiments that fly in space.

This year, 50 teams have been selected to test their designs during a roller coaster-like ride that produces brief periods of microgravity, similar to what astronauts experience during spaceflight. A NASA C-9 aircraft, the military version of a McDonnell Douglas DC-9 jet airliner, flies a series of carefully choreographed maneuvers to achieve this effect. Students will experience how the human body reacts during the 30 climbs and freefalls on each flight that create weightlessness 25 seconds at a time.

The MIT team will fly July 2005 to conduct research on new methods of purifying water in space. The experiment tests the viability of using electric fields to rid water of various types of impurities, a common cause of problems on the space shuttle and International Space Station. Next fall, the team will issue a final report of scientific findings and conclusions.

## SRI LANKA

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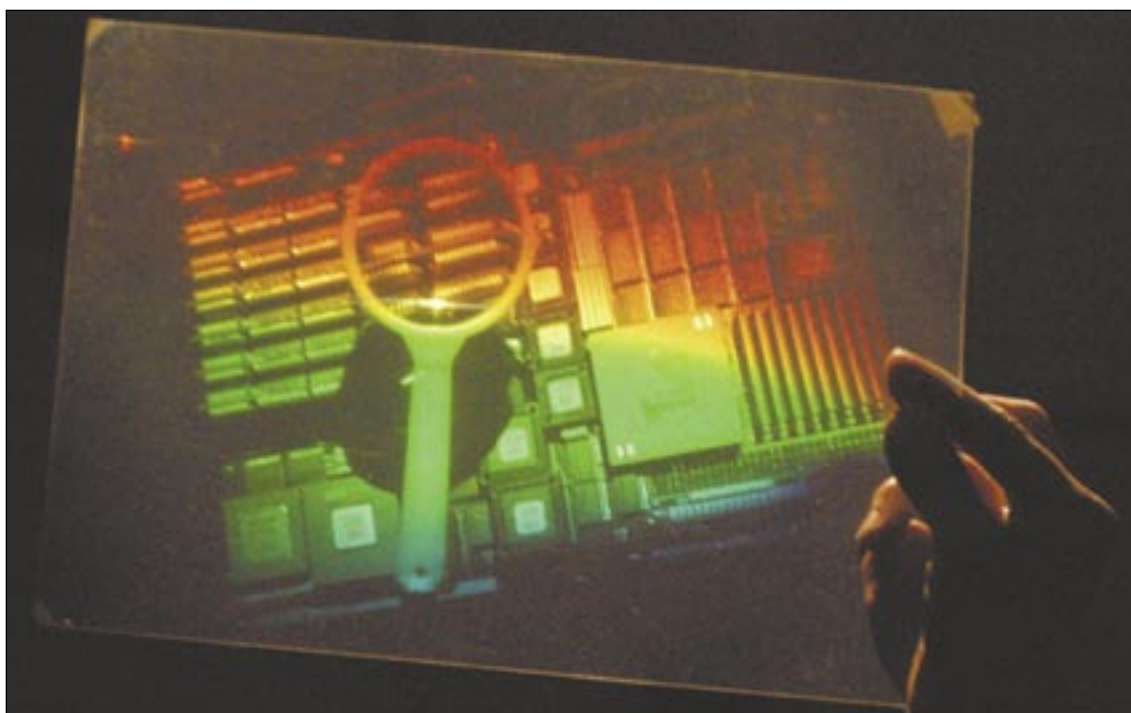
There were no outbreaks of epidemics in this region; most people required only wound dressings and medicines for coughs and skin ailments. The relatively good health conditions indicate that access to clean water and food has not been a problem. The biggest unmet medical need is for psychological counseling. Local religious leaders and hospital psychiatrists have been asked to help, but there are not enough personnel to meet the overall demand. Training of additional social workers is an immediate priority.

The Trincomalee Lions provided details of the disaster management process. The Sri Lankan navy and the Liberation Tamil Tigers of Ealam coordinate relief efforts separately in the territories under their control. Each evening a consortium of non-governmental organizations and aid organizations meet to discuss the most immediate needs.

We were told that teams from Spain, Italy, Russia, Austria, U.S., Britain, Switzerland and India were operational on various projects within and around Trincomalee. It was really encouraging to see the high level of participation by the international community. As of last week supplies of food, water and medicine were adequate and no further relief aid is required.

Rehabilitation and reconstruction is the next important step. There is still no clear plan of where to relocate the more than 1 million displaced people. A blanket construction ban in a beach buffer zone is being debated. Consistent implementation will be a huge political and logistical challenge. While several groups are ready to begin reconstruction, there is just no open land available to build on.

This is driving a fear that people will be stranded in refugee camps for a year or more.



PHOTOS / DONNA COVENEY

## The Light Fantastic

Betsy Connors, photographer, video artist and holographer, taught a mini-course in holography at the MIT Museum and the Media Lab. The media for these works is always light and imagination. This IAP course included white light transmissions, laser

transmissions and holographic shadowgrams. Connors, who has taught numerous IAP courses, is a former fellow at the Center for Advanced Visual Studies and a lecturer in holography in the Media Lab's Spatial Imaging group. She was the co-curator of the

holography exhibit at the MIT Museum and operates the only private holography lab in Boston. Connors' 17-by-10-foot holographic landscape, "Future Gardens," is on exhibit at Boston University's Photographic Resource Center.

# Tips offered on overcoming generation gap at work

Sarah H. Wright  
News Office

If your co-worker's attitudes towards work, privacy or loyalty to the organization just rub you the wrong way, the discomfort may arise from a generational clash and not a personality conflict, according to Marilee Jones, dean of admissions, and Lorelle Espinosa, director of recruitment in the Office of Admissions.

"The Generation Gap at Work," a presentation and discussion led by Jones and Espinosa, explored an unprecedented feature of current American employment: the co-existence of four different generations of workers within the U.S. workforce and frequently, within small offices.

At their IAP session on Jan. 28, Jones and Espinosa provided a framework for

understanding the gaps across generations and offered tips to manage these sometimes baffling and tense relationships smoothly.

They divided the workforce into "Matures," born between 1909 and 1945; "Boomers," born between 1946 and 1964; "GenXers," born between 1965 and 1978; and "Millennials," born from 1979 onward.

"The cohort in a similar age has similar values and characteristics; they have similar attitudes and expectations that are very different from other generations," said Jones, a self-identified Baby Boomer, who used charts and cartoons to show how the characteristics of each generational cohort contrasted with others. For example, she said, "Matures are the silent generation. They value sacrifice, commitment, and financial and social conservatism. They remember the Depression. They're the 'Establishment.'"

"Boomers value themselves. They're competitive, anti-authority. They grew up with Vietnam, Watergate, Woodstock. They have high expectations. They're diplomatic, loyal and want validation. And they value privacy.

"Gen Xers were the first latchkey kids. They're entrepreneurial, pragmatic, straightforward. They grew up with AIDS, MTV, PCs, divorce.

"The Millennials are neotraditionalists, optimistic and very community-centered. They're technologically adept and busy, busy. They grew up with the O.J. Simpson trial, Columbine and 9/11. They're versatile. They write blogs about their lives," said Jones.

"What this means to us is that co-workers may have fundamentally different approaches to work, teamwork, privacy, respect and authority. If you're a Boomer

with Gen Xers working for you, humble yourself and ask them for help. Give them plenty of praise and training in new skills. Think of them as a whole generation of middle children—give them attention. Praise and reward their successes," recommended Jones.

As for working with Millennials, Jones said. "Here's one tip: remember that they are as far from Vietnam as we were from the Great Depression. Spare them the 'back in the day' stories."

Espinosa, a self-identified Gen Xer, offered tips for her cohort to working with Boomers.

"Try to understand them. Find a niche in your work where you can excel. Seek out mentors and get on your director's calendar. If you want to break the ice with a Boomer, ask them about their children," Espinosa said.



PHOTO / DONNA COVENEY

## Falling about the place

"TILT," a collaboration between video artist Ellen Sebring (S.M.VisS 1986) and Boston choreographer Paula Josa-Jones, combined large-screen video, live dancers and a gravity-disrupting mechanism called a "levitron," a sort of padded see-saw with handles at either end, to wonderful effect. Sebring and Josa-Jones held a "TILT" workshop during IAP, which cul-

minated in a demonstration on Jan. 22 in Kresge Auditorium. Performers included Alissa Cardone and Ingrid Schatz, both members of Josa-Jones' dance company Performance Works, and members of MIT's Kinaesthetics Lab, a student choreography group. Cardone and Schatz performed on the Levitron. The MIT students provided the gravitational shifts.

# Van Evera warns terrorist strike a real threat to U.S.

Sasha Brown  
News Office

The terrorist threat to the United States may be even worse than we are being led to believe, professor of political science and associate director of the Center for International Studies, Stephen Van Evera, told a room full of students and faculty at a Jan. 11 discussion on the war on terror.

We are shifting from a very benign world to a very malignant world, said Van Evera, who spoke for two hours on the threat from terror groups like Al Qaeda as well as the disclosure responsibilities of research universities who could be working on projects with terror potential.

"The terror threat is large. I am more pessimistic than others. All the reporting I see suggests that their (Al Qaeda's) recruiting is going very well," he said.

To Van Evera, the unique danger of Al Qaeda—a terror group that has claimed the right to kill two million children—coupled with the number of poorly secured nuclear and biological weapons materials in the former Soviet Union could prove to be a catastrophic combination.

"Most of the Homeland Security program is not very serious," said Van Evera. He also questioned whether research universities should be required to disclose to the public their work on certain types of organisms or technology that could be used as mass weapons.

"If the progress of science risks bringing the democratization of the power to destroy, the public has a right to know this and form a reasoned response," said Van Evera. "We should acknowledge a duty to put the matter before the world so that all of society can together consider what response would be most appropriate."



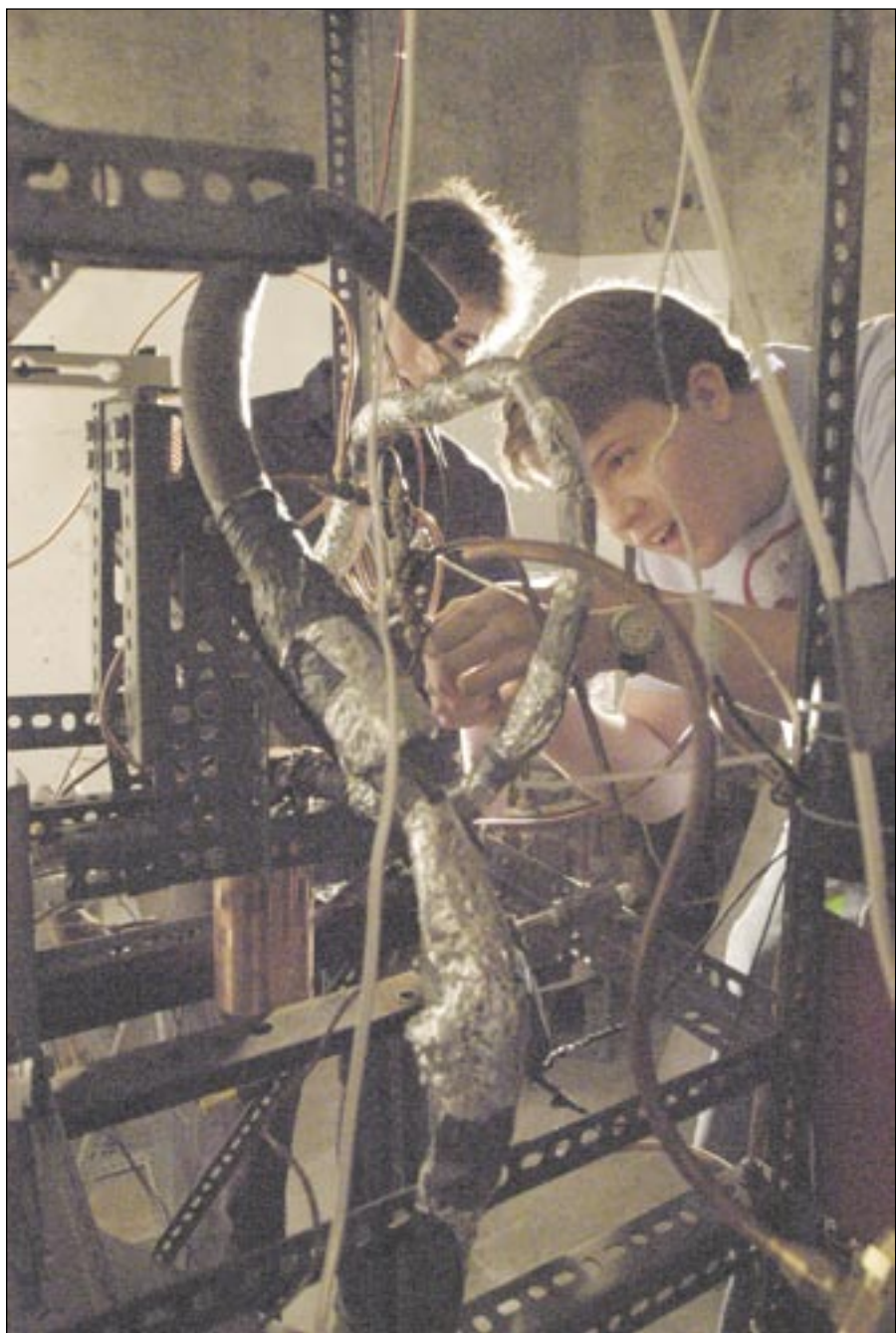


PHOTO / DONNA COVENEY

### Firing on all cylinders

Cameron Dube, a junior in aeronautics and astronautics (left), and freshman Zach Bailey work on a rocket engine for the annual IAP activity. Each January, students design and construct rocket engines using liquid oxygen as an oxidizer and kerosene for fuel. At the end of the month, students spend a full day testing their designs in the blast chamber in the basement of Building 37, which was built to sustain an explosion of two pounds of TNT. The engine with the best burn and the lowest weight wins the contest. Those that blow up automatically receive a score of zero. "The tests can be pretty exciting," said Ph.D. candidate Carl Dietrich, who ran this year's contest.

# Archimedes Pi wins robot competition

Andrew Spann  
Class of 2007

The Mobile Autonomous Systems Laboratory (Maslab), is an IAP course where teams of students build robots that use a camera and sensors to navigate a course whose layout is not disclosed to the teams beforehand. The robots find red balls on the course and deposit them through mouseholes in the wall (three points each) or lift them over the wall to score field goals (five points each). Since more points were awarded for field goals, most of the 15 teams built lifting devices for their robots, including conveyor belts, elevators and arms.

My team consisted of sophomore Daniel Kane, freshman Anders Kaseorg, sophomore You Zhou and myself—all Random Hall residents.

We are pretty sure we violated every single principle of traditional good project management. We formed a team of all math majors or math double-majors. We all lived on the same floor of the same dorm, and were all either freshmen or sophomores. We took longer than the recommended time to complete our robot's mechanical construction, and made many major revisions to our software in the last 48 hours before the deadline, as opposed to debugging existing code.

Yet when the contest day came, our robot, Archimedes Pi, somehow scored the most points.

We addressed the problem of lifting balls by using an Archimedes screw, a rotating helix that pins balls against a wall then lifts them straight up into a gated overhead storage area. Archimedes screws have the advantage of taking up little space and can be run continuously. They have the disadvantage of being hard to construct and prone to jamming. We solved the jamming problem by using two screws of opposite chirality to pincer the ball against a post in the center of the screws. To make the screws, we pulled string tightly around PVC pipe to trace an outline, then sawed them by hand.

Developing clever algorithms to process input from the camera and explore the contest playing field was essential.

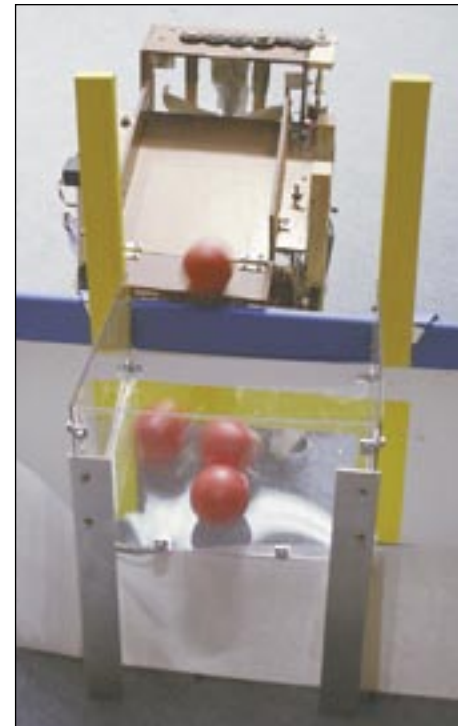


PHOTO / JONATHAN WANG

The fifth ball is still halfway up the Archimedes screw (not visible in this picture). "We knew it took a little over 20 seconds to lift a ball up, so we programmed the robot to remember when the last time it picked up a ball and not leave the goal until 30 seconds after this time, if it docked early," said team member Andrew Spann. "The robot docked with about a minute of time remaining, then waited until just after the fifth ball fell in the goal before pulling back out. It was really cool to watch."

We used Java. Our team's navigation code made a local map and dropped imaginary force-field beacons to repel the robot, turning it toward new areas. Sensors—including infrared, bump sensors, gyroscopes and optical encoders to detect wheel movements—were available to help determine position and avoid walls.

During the three-minute run, Archimedes Pi grabbed the five most-accessible balls, then dropped them over the wall to score five field goals. That 25 points made Archimedes Pi the winner.

# Agatha Christie mystery for aero/astro engineers

Sasha Brown  
News Office

After every plane crash, an accident investigation team ultimately helps to improve safety standards for future fliers.

Every January for the past four years, Brian Nield (S.B. 1978), manager of aerodynamics engineering and product development at Boeing, has assembled a group of hard-working students to spend three days investigating the cause of a fictitious accident.

In the scenario Nield presents each year, an airplane roughly the size of a 737 carrying 10 people crashes off the shore of Bermuda while en route to the United States. Each day, bits of the mystery unfold for students, said Nield.

On the first day of the three-day/nine-to-five course, students are given radar returns, weather and transmissions from the day of the crash. That night, they try to piece together what might have happened.

The next day, more information is revealed. Students are even given the chance to read the transcript of the cockpit recording. Each of the clues is specifically designed to unravel another part of the mystery. Each day, the students make presentations of their findings, so they can

benefit from one another's theories.

Students also study real-life crashes like the 1999 crash of EgyptAir 990 off the coast of Nantucket. That crash was also in deep water and used radar technology. With real-life examples, it can be a little tricky, said Nield. "You always want to be sensitive to the fact that crashes do have fatalities," he said.

The importance of the accident investigation team cannot be stressed enough. "They are one of the reasons planes are so safe," said Nield.

For the students, the opportunity can be an eye-opener. "I have certainly had students ask me how they can get into the field," said Nield.

After reviewing the scenarios each student presents, the class sees a "video" of the crash generated by Nield. The video explains the true cause; students can compare their answers to it.

The students get really into the project, he said. Some work until the wee hours of morning coming up with scenarios to present to the class. "It is amazing how creative some of them can be," said Nield.

Since the scenario is the same from year to year, participants are sworn to secrecy so as to not spoil the fun for future students.

"It's like Agatha Christie for engineers," Nield said. "It can be a lot of fun."



PHOTO / DONNA COVENEY

### Sticky fingers

Melissa Latigo, a senior in biology, holds the roses she made of duct tape during the IAP course, Duct Tape Delusions, held at the Edgerton Center and the MIT Museum from Jan. 27 to 29.



# New Century Cities emerging from New York to Seoul

Ellen Williams  
Center for Real Estate

Some 150 invited participants convened Jan. 18 and 19 for the New Century Cities symposium. They hailed from four continents and from disciplines ranging from traditional city-builders—architects, city planners, and construction firms—to high-tech (Cisco Systems, Hewlett-Packard, IBM) and media firms, and included historians, educators and artists.

What brought them together was a shared belief that the cities of the next century will be radically unlike the cities of the past. The symposium showcased some spectacular examples of these new-century cities (NCCs) that use advanced communications and technology to improve the quality of urban life as they promote social and economic objectives. Many NCCs are very large-scale developments; all are laboratories for exploring new ways of living, working and learning.

The symposium was sponsored by the Center for Real Estate, the City Design and Development Group, and the Media Lab, all in the School of Architecture and Planning.

The projects that were presented ranged from implementing wireless neighborhoods (lower Manhattan) and whole cities (Philadelphia), to developing entirely new towns, such as Seoul's Digital Media City. Projects ranged in size from Singapore's 450-acre district for advanced technology research to the 24-acre Northern Ireland Science Park.

Still other projects were academically oriented, including Crossroads Copenha-

gen, an "international center of research and development in the fields of culture and media." Public involvement in the development process characterized Crossroads Copenhagen, as well as Helsinki's Arabianranta district, devoted to art and design, where collective online decision-making brought residents into the layout process.

Welcome to the new age of urban development. Connectivity is reshaping the built environment. "In the future, connectivity and intelligence will be part of a building, just as lighting and air-conditioning are today," said William Mitchell, head of the Media Arts and Sciences Program at MIT. He described buildings of the future as "programmable devices responding actively and intelligently to changing needs and conditions," with agile interiors that can be reconfigured on demand into large or small workspaces, and light-sensing exterior "skins" that dynamically block glare.

Project presentations were followed by brainstorming. Attendees sought to extract common ground, not to mention common terminology, from the welter of social, intellectual, technological and political factors that impacted their projects. The symposium closed with the exhilarating sense that a new community of city developers had coalesced. Symposium organizers Dennis Frenchman, director of the City Design and Development Group in DUSP, and Michael Joroff, senior lecturer in DUSP, said they plan to hold future meetings.

More information about the symposium, including summaries of the projects, is available at the Center for Real Estate's web site.

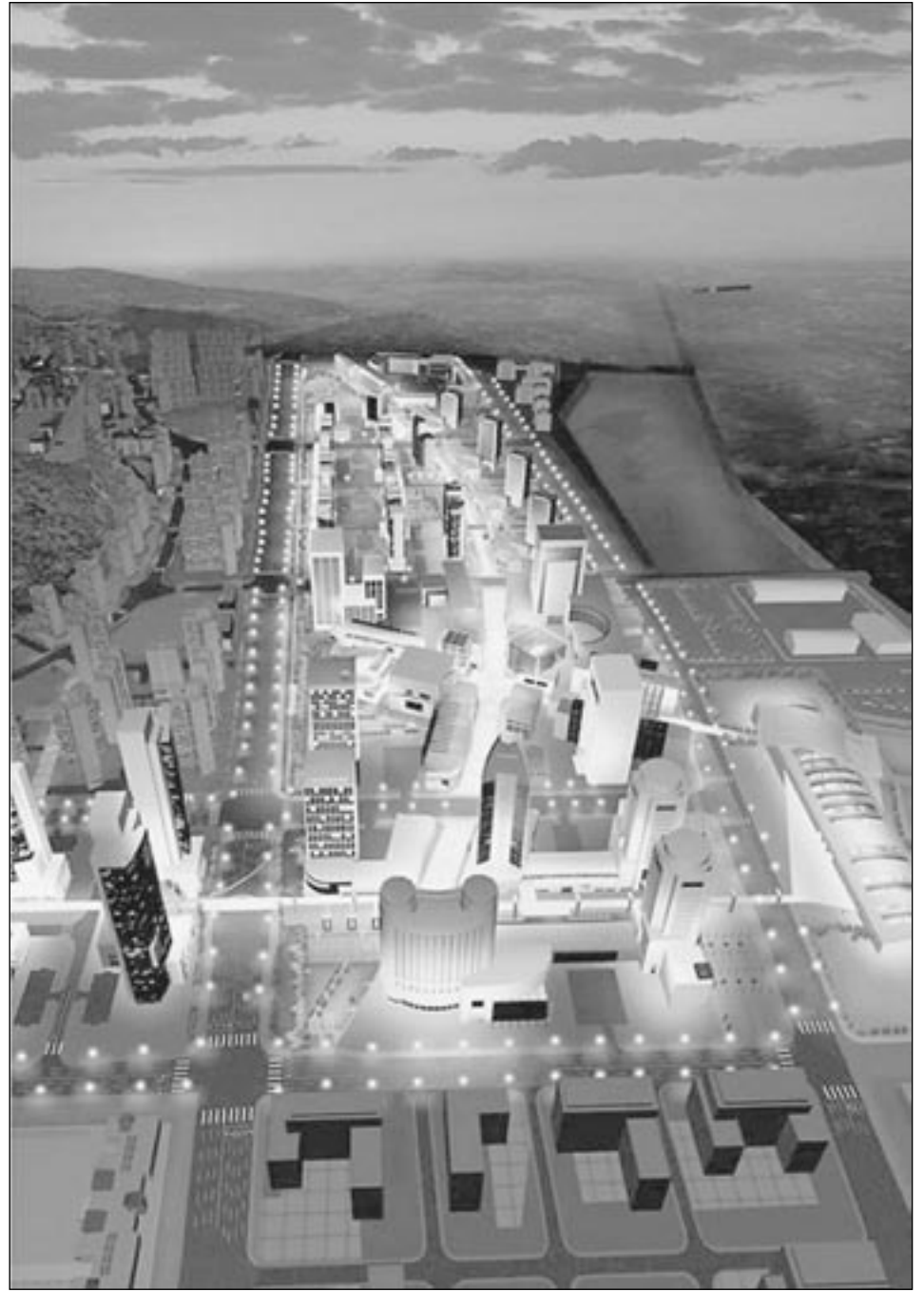


IMAGE / DONYUN KIM AND ARCHPLAN, INC.

A computer-generated night view of Digital Media Street in Seoul's Digital Media City.

## Study finds supply chain predictions too optimistic

Ken Cottrill  
Center for Transportation and Logistics

Long-range business forecasts are notoriously uncertain, but that does not stop pundits from attempting to divine the future. An extensive review of predictions about the supply chain revealed some agreement on the future shape of supply chains, but also raised many questions.

Supply Chain 2020 is a multiyear effort to identify and analyze the factors that are critical to the success of supply chains up to the year 2020. As part of the project, Mahender Singh, a research associate at MIT's Center for Transportation and Logistics, analyzed predictions about the future of the supply chain.

"There seems to be a consensus that different organizations will gel together to form virtual organizations that will ramp up or down to meet demand as needed," Singh said. In this scenario customers take total control over the creation and delivery of services, and there is a "presumed environment of total trust and commitment from all involved in the creation of such alliances." Singh also observed "an unspoken assumption" that national boundaries will disappear to make way for unfettered trade, and

the emergence of mature economies around the globe will "enable frictionless trade."

He believes this to be a utopian view. "It is difficult to imagine a supply chain that will share risks and rewards objectively among its constituents," he said.

Also overly optimistic are the predictions of free-flowing, borderless trade. In the current political environment the trend is in the other direction—to introduce more restrictions on the movement of goods and people to counter the threat of terrorism and instability. Moreover, there is a tendency to form regional alliances as a protective measure against the economic dominance of the United States, Singh pointed out. Although he anticipates tremendous advances and more efficient supply chains, "the concept of total connectivity will likely be present only in spirit," he said.

The rosy predictions also contain contradictions that strike at the heart of how businesses compete and grow today. "Many visions predicted or assumed complete sharing of information or knowledge," he explained. However, sharing these resources could be problematic given that future competition is expected to rest on information-based strategies.

Given these shortcomings, is prophesying a worthwhile activity? Singh believes it is, because it helps com-

panies prepare for change. Further, the future of supply chains is shaped by macro factors such as geopolitical shifts and changing energy costs, and modeling these trends—even though the models are inaccurate—illuminates possible strategies.

The key is to avoid point forecasts that are inherently unreliable, and instead, present the future as a set of multiple likely scenarios, Singh advises. (The Shell energy company originally developed this approach, called Scenario Planning.)

Singh, who is also affiliated with MIT's Engineering Systems Division, found the predictions through a search of library catalogues and web-based resources including books, journal articles, white papers, industry presentations, research studies and commentaries. Filtering the material for relevance and importance pruned the list down to 70 publications. A second review yielded a final set of 46 publications.

His working paper, "A Review of the Leading Opinions on the Future of Supply Chain," is available online through the CTL web site.

*A version of this article originally appeared in the Dec. 28 issue of the online newsletter, "MIT Supply Chain Frontiers."*

## Joint MIT-Wellesley course studies alternative education

Sarah H. Wright  
News Office

This spring, the Experimental Study Group is offering a new undergraduate seminar in which participants will explore alternative approaches to college education and custom-design an entire college program to support individual learning styles.

The Alternative Education Seminar (SP.249) is the first of its kind in the Experimental Study Group (ESG), the MIT undergraduate program known for its innovative, interactive freshmen seminars. A joint MIT-Wellesley course, Alternative Education will be team-taught by faculty from both institutions with guest speakers from these and other schools. Sessions will be held at MIT during the first half of the term and at Wellesley the second half. The

seminar is open to all MIT and Wellesley students.

Patricia Christie, a lecturer in ESG, and Kenneth Hawes (S.B. 1968), an assistant professor of education at Wellesley College, are co-leaders of the new seminar.

"I am always thinking of ways to improve the way I teach, and looking at different means of getting the information across to students," Christie said. "I hope that students who take the seminar get an understanding of what an education means and how many different ways you can learn something. I also hope that this seminar will provide both the students and me with a means of incorporating alternative approaches in courses at MIT or Wellesley."

Hawes, who was an electrical engineering major at MIT, teaches education at Wellesley and has worked with the MIT/Wellesley teacher education program for the past 20 years. He traces some of his interest in education back to a writing course he took his senior year, to his

experiences studying math, science and engineering in small groups, and to reading "Summerhill," by alternative educator A.S. Neill, founder of the Summerhill School in 1921.

"In spring 1968, a very politically eventful time, I took a seminar with a writing teacher, Sanford Kaye, which was unlike any course I had taken before, partly because of the approach of the class and the readings, and partly because what I wrote had a resonance and meaning for me that other things had not had," Hawes said.

The Experimental Study Group, now in its 36th year, provides first-year students at MIT with personalized instruction in the core subjects within a close-knit and informal environment. For the past 11 years, ESG has offered seminars in subjects not regularly offered at MIT to provide all MIT undergraduates with an opportunity to participate in the ESG style of learning.

# Southworth makes music outside the rules

MIT alumna Christine Southworth's latest composition for generator, robots, instruments and voices features some high-voltage star-power – the 40-foot-tall Van de Graaff (VDG) generator at the Museum of Science in Boston.

Southworth, who graduated from MIT in 2002 in mathematics with a minor in music, incorporates the flashing lights and static from the popular de Graaff generator along with robotic instruments and live performers in her new piece, "Zap! Music for Van de Graaff Generator, Robots, Instruments and Voices."

"Zap!" will premiere on Friday, Feb. 4 at 6:30 p.m. at the Museum of Science's (MOS) Theater of Electricity.

The de Graaff is the largest of its kind in the world and is capable of producing up to 1.5 million volts of electricity

Like Southworth, the generator, is, in a sense, also an alumnus of MIT. Designed and built at MIT in the 1930s by MIT Professor Robert J. Van de Graaff, the generator was originally used as a research tool in early atom smashing and high-energy X-ray experiments. MIT gave the generator to the Museum of Science (MOS) in 1956, where it is now used in daily demonstrations of lightning and electricity.

"Zap!" is an offshoot of a project started by Southworth and Leila Hasan (M.Eng. and S.B. Electrical Engineering 2001), called Ensemble Robot, a small collection of robotic musicians who produce both simple and complex patterns of sound from acoustic sources including strings, pipes, drums and wooden keys. "Zap!" will include at least three of these robots but "not all the robots are happy playing in proximity to the high voltage," Hasan said.

Southworth and Alexandra Andersson (S.B. Electrical Science and Engineering & S.M. Electrical Engineering and Com-

puter Science 2003) will be responsible for triggering various "zaps" from the generator and its surrounding Tesla coils. At the same time, Hasan will control variations in voltage using her MIT thesis project: a musical interface/sensing device, inspired by the Therenin, that she calls a "termenova."

Human musicians rounding out the cast are Ramon Castillo (conductor/music director), Akili Haynes (percussion/voice), Blake Newman (bass), Erik Nugent (Lyricon/voice), Sachi Sato (keyboard), Mei-mi Lan (keyboard), Christine Southworth (voice), Rebecca Zook (cello) and Jeff Lieberman (guitar/keyboard), an MIT alum (S.B. Mathematics and Physics 2000, S.M. Mechanical Engineering) currently pursuing a Ph.D. in Media Arts and Sciences.

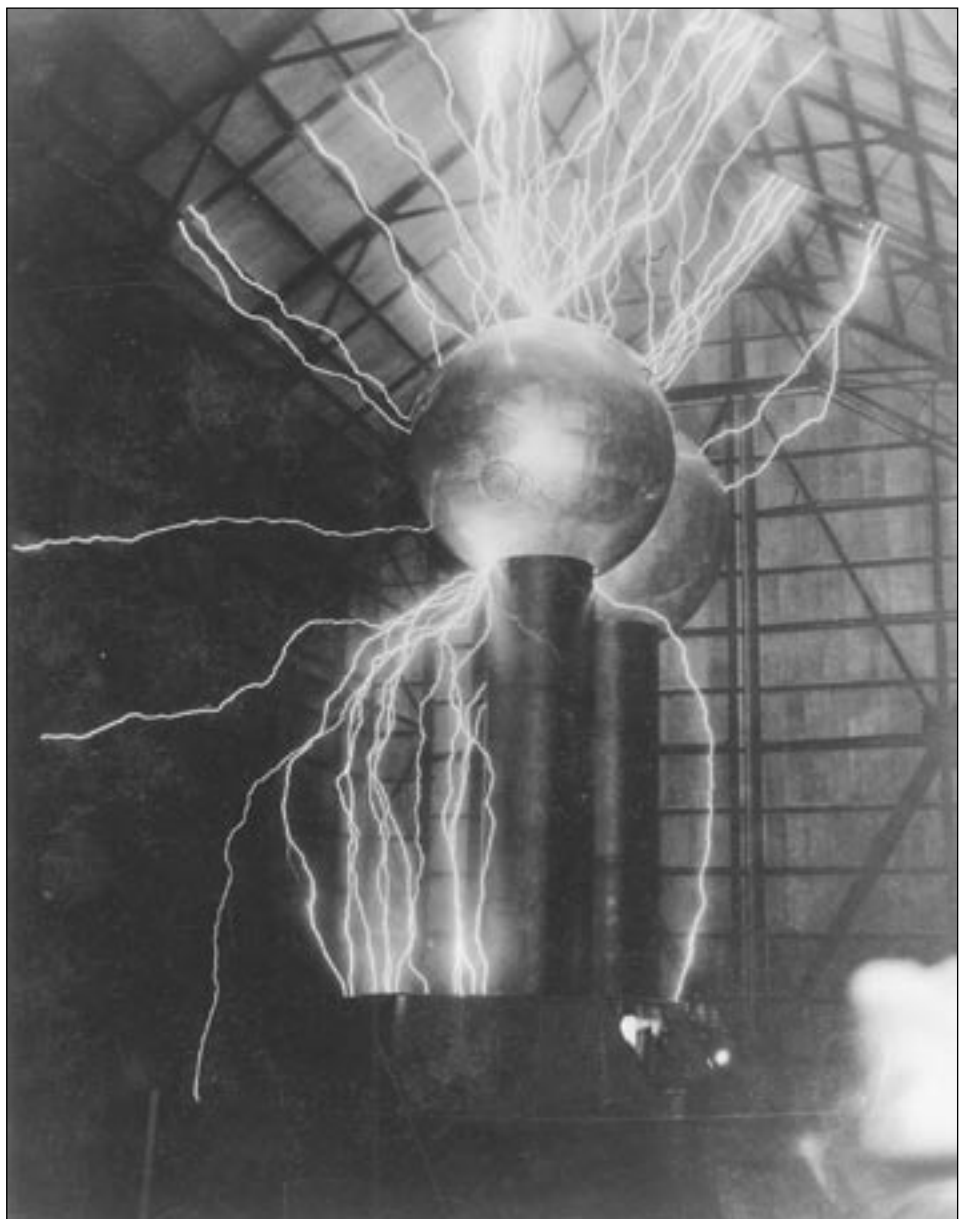
Other contributors to the project include Mike Mayo (sound design), Yucheng Hsu and Giles Hall (programming) and MIT alums Luke Phelan (S.B. Humanities 2002—documentation) and Kevin McCormick (S.B. Electrical Engineering and Computer Science 1999—lighting design).

Southworth is currently pursuing a master's degree in Computer Music and Multimedia Composition at Brown University and continues studies in composition with Kenan Sahin Distinguished Professor of Music Evan Ziporyn, with whom she has also edited and mixed two records. She has received awards and fellowships from the American Composers Forum, The Ernest Bloch Music Festival, Bang on a Can Summer Institute of Music and the MIT Eloranta Fellowship. A member of MIT's Gamelan Galak Tika, she also teaches electronic and Balinese music composition to children and adults in Cambridge and Boston.



PHOTO / EVAN ZIPORYN

"Zap!" composer Christine Southworth (S.B. 2002) poses with the Van de Graaff generator that provides static and flashing lights for her musical composition. "Zap!" is a seven-part piece featuring the former atom-smasher in concert with flutes, guitar, cello, bass, piano, robots and human voices.



The Van de Graaff generator (above) is the largest of its kind and can produce up to 1.5 million volts of electricity. In Southworth's composition, zaps from the generator will be triggered by humans; voltage will be controlled by a "termenova," a musical sensing device.

## ArtTalk: Christine Southworth, composer

Lynn Heinemann of the Office of the Arts asked composer Christine Southworth why she chose to cast the 40-foot de Graaff generator in "Zap!"

**Q.** Why a Van de Graaff generator?

**A.** The Van de Graaff generator is spectacular. It makes huge sparks of lightning, big booming sounds; or it can make a beautiful glowing corona with a sweet humming buzz. I came up with this idea with Andy Cavatorta, who works at the museum, and it just made sense. For this piece, I've treated the Van de Graaff generator as a combination percussive instrument and light show.

**Q.** How did you get the idea for this project?

**A.** About two years ago I decided that I needed to make robots to play my music, because it was too hard for people to play. This was more of an issue with my notation than anything else, but I thought it would be amazing to be able to play electronic music, as a midi sequence, on real instruments. My friend Leila Hasan builds robots, so soon after that we started applying for grants to make this happen, and

Ensemble Robot was born. With generous support from the LEF Foundation, we've spent the past year developing this project.

We went to the museum about a year ago with the idea of putting the robots in the museum as entertainment, perhaps in the cafeteria or lobby. While we were exploring possibilities with that, Andy Cavatorta mentioned the Van de Graaff generator and this project just exploded into being.

**Q.** Does "Zap!" fall into an identifiable musical category?

**A.** My music could be called "post-minimalist acoustic electronica," amplified. I've been influenced by classical music—Vivaldi, Bach—and by modern music—Steve Reich, Terry Riley, Michael Gordon, Louis Andriessen, Arnold Dreyblatt, Meredith Monk, and of course by my teacher, Evan Ziporyn. I've also been influenced by electronica, jazz, hip-hop and rock and roll, specifically Kraftwerk, the Beatles, and Tribe Called Quest. And gamelan! I would say my music is pretty; it rocks, grooves, and follows no rules really. My teacher at Brown, Shep Shapiro, said "This music doesn't break the rules; it rather renders the rules obsolete." I like that.

### CLASSIFIED ADS

Members of the MIT community may submit one classified ad each issue. Ads can be resubmitted, but not two weeks in a row. Ads should be 30 words maximum; they will be edited. Submit by e-mail to [ttads@mit.edu](mailto:ttads@mit.edu) or mail to Classifieds, Rm 11-400. Deadline is noon Wednesday the week before publication.

#### FOR SALE

Butcher Block table. 3 foot by 5 foot, trestle. 1.75 inch thick top. Oil finish. \$400. Pick up in Belmont. Clare x3-7708 or [clares@mit.edu](mailto:clares@mit.edu).

Men's Jacket. Brown leather looks, 3/4 length, size large. Fleece lining throughout, made in Italy by T. Shearling Sportswear, new. \$60. Rosalie at 781-391-1307.

#### HOUSING

East Boston, Eagle Hill: 1 BR, lots of storage, off st. prkng. Patio, backyard. Near public trans. View of Zakim Bridge. No pets. Avail. now. \$1,050/mo. 781-608-0182 or [wabbikalemba@yahoo.com](mailto:wabbikalemba@yahoo.com).

Inman Sq.: furnished room for visiting faculty/postdocs, short-term 1 to 6 months, \$250/

week, \$950 – \$1,000/mo. Kitchen, laundry, all utils, cable and wireless LAN, linens, included. Walk to MIT. References. 617-625-9839 or [sokolovska@mac.com](mailto:sokolovska@mac.com).

Somerville: 3BR, 7rm. Refurberd, central air, 10 mins to MIT, cats ok. \$1,400, no utils. 2BR, 6rm. Refurberd, 10 minutes to MIT, cats ok. \$1,300, no utils. Fred or Diane at 781-279-9048.

Martha's Vineyard cottage. 2 BD/1.5BA outside of Oak Bluffs w/wraparound deck, outdoor shower, BBQ, sunny open interior, DW & W/D. Lagoon, tennis & bike trails. Reasonable. Nina at [ninad@mit.edu](mailto:ninad@mit.edu).

### STUDENT POSITIONS

ReachOut seeks MIT students as reading partners for children in school and after school programs. Training provided. New tutors must attend orientation on Feb. 4 from 3:30-5pm, Rm. 4-237. Application: <http://web.mit.edu/mitpsc/programs/reachout/>

Grad or undergrad with strong background in genetics and genetic bioinformatics for a web-based research project. Requirements: working familiarity of bioinformatics databases, attractive material presentation. Martha at [mherbert1@partners.org](mailto:mherbert1@partners.org).



MIT EVENT HIGHLIGHTS FEBRUARY 2 - 6

-  Science/Technology
-  Performance
-  Architecture/Planning
-  Humanities
-  Music
-  Exhibit
-  Reading
-  Special Interest
-  Business/Money
-  Film
-  Sports
-  Featured Event



**Quintessential Brass**

Quintessential Brass features Matt Ara, trumpet; Leslie Havens, bass trombone and tuba; David Lindsey, trombone; Christine Fawson, trumpet; Robin Milinazzo, horn. Feb. 3, noon, MIT Chapel.

**WEDNESDAY**  
February 2



**Groundhog Day**  
Punxsutawney Phil makes his winter weather prediction.

**Where Do We Go From Here?**  
Professor Naomi Chazan talks on prospects for an Israeli-Palestinian rapprochement. Noon. E38, 6th Floor Conference Room. 253-8092.

**EAPS Department Lecture Series**  
Dr. Linda Elkins-Tanton of Brown University talks on early planetary crusts, magnetic fields, mantle heterogeneity, and the fate of water. 4-5pm. Room 54-915. 253-3382.

**Start-up Clinic**  
Discover how to present a plan to potential investors. 6-9pm. MIT Faculty Club. 253-8240.

**THURSDAY**  
February 3

**31st Annual MLK, Jr. Breakfast Celebration**  
Speaker: journalist Gwen Ifill. 7:30am. Morss Hall. 253-7940.

**Great Works for the 21st Century**  
Richard Newton of UC Berkeley talk on research universities and collaboration for a global research agenda. 4:15-5:45pm. Room 32-123. 253-0145.

**First Rehearsal for MIT Women's Chorale**  
All women in the MIT community are welcome to join. 7:45-10pm. Room 10-340. 643-0771.

**The Internationalist**  
Play by Anne Washburn directed by Janet Sonenberg. Feb. 3-5 and 10-12. \$8, \$6 students. 8pm. Kresge Little Theater. 253-2908.

**FRIDAY**  
February 4

**Young Inventors at MIT**  
Objects displayed chronicle the past decade of Lemelson student prize winners. MIT Museum, 10am-5pm. 253-4444.

**Modern Times, Rural Places Seminar**  
Helen Tilley of Princeton speaks on "Tropical Infertility: Scientific Research on Soils and People in Equatorial Africa, 1880-1940." 2:30-4:30pm. Room E51-095. 253-4965.

**Tsunami Candlelight Vigil**  
Nationwide tsunami candlelight vigil supported by AID-Boston and the MIT-Sri Lankan Student Association. 7pm. Copley Square, Boston.

**SATURDAY**  
February 5

**Gaijin**  
Photographs by Bahadir and Melissa Kavlaki, administrative assistant, Office of Environment, Health and Safety. All month. 1-6pm. Room 7-238.

**Gallery Talk: Clipper Ships & Gold**  
In conjunction with the current exhibition "The Clipper Ship Era." 2pm. MIT Museum. 253-4444.

**Chinese New Year Celebration**  
7-10pm. Student Center.

**Chinese New Year Performance**  
7:30-11:30pm. Lobdell Dining Hall.

**The Who's "Tommy"**  
Musical Theatre Guild production Feb. 3-5. \$10, \$8 non-MIT students, \$6 MIT/Wellesley. 8pm. Sala de Puerto Rico. 253-6294.

**SUNDAY**  
February 6

**Student Origami Competition**  
Submit pieces to the Office of the Arts. Creative paper choices and original designs encouraged. No glue or tape allowed. Deadline: Monday, Feb. 7. 5pm. Room E15-205.

**Superbowl Sunday**  
Cheer on the Patriots with Hillel House. 5-10pm. W11.

**Mardi Gras Carnival**  
Celebrate Mardi Gras and enjoy food, music, and games and learn how different cultures celebrate this event. 6-9:30pm. Walker Memorial.

**International Folk Dancing (participatory)**  
8-11pm. Lobdell Dining Hall. 253-FOLK.

**Go Online!** For complete events listings, see the MIT Events Calendar at: <http://events.mit.edu>.  
**Go Online!** Office of the Arts website at: <http://web.mit.edu/arts/office>.

EDITOR'S CHOICE

**"THE INTERNATIONALIST"**

*Feb. 3*

Dramashop production of Anne Washburn play directed by Janet Sonenberg. Feb. 3 to 5 and 10 to 12. \$8, \$6 students. 253-2908.

**Kresge Little Theatre**  
8 p.m.

**TSUNAMI BENEFIT CONCERT**

*Feb. 5*

MIT students play music, from jazz to rock to klezmer. By donation. 253-2982.

**MIT Chapel**  
8 to 9:30 p.m.

**WOMEN'S STUDIES SYMPOSIUM**

*Feb. 12*

Patricia Williams, Chandra Mohanty and Barbara Ehrenreich. Presented for the Program in Women's Studies 20th Anniversary.

**Room 10-250**  
10 a.m. to 4:30 p.m.

MIT EVENT HIGHLIGHTS FEBRUARY 7 - 13

**MONDAY**  
February 7

**Blood Drive**  
Blood drive sponsored by MIT's American Red Cross Team and Network. Feb. 7, 9 and 11, Noon-6pm; Feb. 8 and 10, Noon-4pm. Student Center.

**The Traveling Magazine Table**  
Assortment of rarely circulated local and international magazines. Noon-6pm. Room N52-390. 452-2484.

**Tax workshops kickoff**  
Kickoff to tax workshops taking place in February and April. Cambridge City Hall. 2:30pm.

**Student Origami Competition Deadline**  
Submit pieces to the Office of the Arts. Creative paper choices and original designs encouraged. No glue or tape allowed. 5pm. Room E15-205.

**TUESDAY**  
February 8

**What Does a Martian Look Like?**  
Lecture by Dr. Jack Cohen, professor of mathematics, Warwick University, UK, and an internationally recognized reproductive biologist. 6pm. Room 32-123.

**Architecture Lecture**  
Schein Memorial Lecture by Hans Hollein, architect, Vienna. 6:30pm. Room 10-250. 253-7791.

**Chicks Make Flicks: Cynthia McKeown**  
Talk and showing of Cynthia McKeown's movie, "One in Eight: Janice's Journey." 7pm. Room 32-134. 253-8844.

**Imobile Breakdancing Practice**  
7:30pm. McCormick Residence, Dance room.

**WEDNESDAY**  
February 9

**Visualizing Physics: Transforming Science Learning at MIT**  
Get an insider's view of how MIT is redesigning the way it teaches physics. 10am-5pm. MIT Museum. 253-4444.

**American Air Power: What a Difference a Decade Makes**  
Thomas A. Keane, Executive Director of the Foreign Policy Institute at Johns Hopkins University discusses American air power. Noon. E38, 6th Floor Conference Room. 253-8092.

**Tute Ice Cream Spring Semester Celebration**  
4-5:30pm. Room 10-105. Sponsored by LGBT. 253-6777.

**Chinese Spring Festival Party**  
7:30-11:30pm. Sidney-Pacific Multipurpose Room.

**THURSDAY**  
February 10

**MIT Chapel Concert**  
Harpsichord recital by Takae Ohnishi. Noon. MIT Chapel. 253-9800.

**Sahin Lecture Series**  
Patrick Rael of Bowdoin College speaks on "African American Responses to Racial Science from the Revolution to the Civil War." 4:30pm. Room E51-275. 253-4965.

**Opening Reception**  
Openings for Pavel Braila and Kimsooja: Seven Wishes and Secrets. 5:30pm. List Visual Arts Center. 253-4680.

**Opening Reception and Lecture**  
Mark Goulthorpe of dECOi architects speaks in conjunction with exhibition at Wolk Gallery. 5:30pm. Room 7-338. 253-2825.

**FRIDAY**  
February 11

**MIT Women's Studies 20th Anniversary**  
Panel discussion with alums from the 20 year history of MIT Women's Studies Programs discuss "Taking Women's Studies into the Real World." 3-5pm. Emma Rogers Room. 253-8844.

**Gallery Talk by Bill Arning**  
Tour current exhibits. 6pm. List Visual Art Gallery. 253-4680.

**MIT Anime Club Weekly Showing**  
The MIT Anime Club shows the best of Japanese animation. 7pm. Room 6-120.

**SATURDAY**  
February 12

**A Needle Woman**  
Videos created between 1999 and 2001, document Kimsooja, dressed in simple gray clothing standing rigidly in the busy streets of Tokyo, Shanghai, Delhi, New York, Mexico City, Cairo, Lagos, and London. Media Test Wall, Whitaker Bldg 56. On view 24 hours. 253-4400.

**Varsity Men's Volleyball Tri-Match vs. Rivier and**

**Elms**  
10:30am. du Pont Gymnasium. 258-5265.

**Artist Talk**  
Pavel Braila speaks about his exhibit at the List Center. 2pm. List Visual Arts Center. 253-4680.

**Chinese New Year Celebration**  
7pm. Student Center.

**SUNDAY**  
February 13

**The Clipper Ship Era**  
Exhibition focused on the design, construction, speed and social experience of the clipper ship era. MIT Museum. Noon-5pm. 253-4444.

**International Folk Dancing (participatory)**  
8pm. Lobdell Dining Hall (2nd floor) 253-FOLK.