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.

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

While many huddled 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 in your brain, a moment when 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.

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 "bombogenics"—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 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 north-eastern 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 unscreened furniture, clothes, books... everything. As this wave receded it left a quarter mile of seabeach 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 Kirandurtipiti, 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

Tropical seesaw: flooded Amazon means drought in Congo

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 reat 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 Elliot A. B. Ehhair 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
Tsunami puts book and its editors in demand

Tsunami puts book and its editors in demand

Resilient City: How Modern Cities Recover from Disaster"

Patti Richards

With the country still reeling from the Sept. 11 terror 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 even the most catastrophic events.

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 learn to bounce back 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 would-be authors, they were hoping that the book’s publication date coincided with another monumental tragedy, to be the backdrop for the book. But in the end, the book’s publication date coincided with another monumental tragedy. The result was a book that explores how cities manage to persevere through even the most traumatic attacks.

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 there is really a connection between, say, the Chicago fire of 1871 or the great fires that swept around the world, and the great waves that washed away the beaches of several Indian Ocean countries," Vale said.

"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 in the country that has been devastated? How is the built environment used to symbolize key moments of resilience?"

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 exploration, 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 progressive-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,” Vale said.

Probably the biggest priority competing with the wish to aid survivors—at least in southern Thailand and Sri Lanka—is the wish to restore tourism to the tourism industry. And this in itself will “be a promoter of forward-looking and optimistic kinds of scenario, 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

Design changes to an engine commonly used to power factories and residential buildings to make them more fuel-efficient and reduce emissions, according to a team of MIT researchers.

Using a new model and experiments in a full-scale engine, the researchers determined that 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 ideally suited for multiyear operation. 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 colleagues in the Skan 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, more than 80 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 being 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 team then examined the individual components, how they fit together, and how they behave and interact when the engine is running. But just determining whether 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’s a big deal."

"We mean to have a 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, Professor John B. Heywood, Erol Yilmaz (MIT Ph.D. 2004), and graduate student Jeffrey Loeck.

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 of the piston to increase 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 in the experimental engine.

The computer model suggests that making these three changes at the same time could improve overall fuel economy by about five percent. "That’s by no means a negligible gain," said Wong. "It will 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

Continued from Page 1

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 moisture with climate conditions, such as rainfall systems. As he explains, the world has more than rain fall centers where intense storms with a global reach originate: the Western Pacific Ocean, the Americas, 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 graduate student Teresa K. Yamana to look at the data for the Amazon and Congo basins. In 2002. In the resulting graph, the lines for the two regions formed mirror images—high rainfall for the Amazon/low rainfall for the Congo—that looked like a seesaw. The observation held true not just 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 1965, scientists had tracked the river flows of both the Amazon and Congo. Because the rivers drain the entire water basins of the two rainfall centers, their flows serve as surrogates for regional rainfall. Again, the results 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 Arse Bomblies 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 hydrometeorologic conditions."
To honor the memory of MIT alumnus Ronald E. McNair, an astronaut who was tragically killed in the explosion of the Challenger, Burchard Scholars will be invited to a series of dinners this fall. The dinners will be held by the Society of Humanities, Arts and Social Sciences, the School of Aeronautics and Astronautics, and the Office of the President. The dinners will provide an opportunity for students to interact with alumni who have made significant contributions to the field of aeronautics and astronautics. The dinners will be held at various locations throughout the year, including the MIT campus, the NASA Johnson Space Center, and the Kennedy Space Center. The dinners will feature panel discussions, keynote speeches, and a chance to network with alumni and faculty. The dinners will be open to all students, and there is no cost to attend. For more information, please contact the Society of Humanities, Arts and Social Sciences at humanities@mit.edu.
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 discomfit 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.


“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 Millenials 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 them, pour your soul into them 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, recognize their contributions,” Jones recommended.

As for working with Millenials, 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.

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 from 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.”

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Donna Covenev

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-feet holographic landscape, “Future Gardens,” is on exhibit at Boston University’s Photographic Resource Center.

PHOTOS / DONNA COVENEY

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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 the contest playing field.

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 mousholes 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 conveyer 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.

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 crashes into the coast of Nantucket. That crash was also 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 fatalities,” he said.

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 shows 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.”
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—Canada, Europe, Asia, and the U.S.—representing a wide cross-section of professions and expertise—architects, city planners, and construction firms—to high-tech (Cisco Systems, Hewlett-Packard, IBM) and media firms, and included historians, sociologists, and futurists.

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 environmental 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 (dower Manhattan) and whole cities (Philadelphia), to developing entirely new towns, such as Seoul’s Digital Media City. Projects ranged in size—from Singapore’s 45-acre district for advanced technology research to the 24-acre Northern Ireland Science Park.

Still other projects were academically oriented, including Crossroads Copenhagen, an “international center of research and development in the fields of culture and media.” Public involvement in the NCC development process characterized Crossroads Copenhagen, as well as Helsinki’s Arabianraita 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 its intelligence will be part of the very fabric of the environment,” 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 sessions where attendees sought to extract common ground, not to mention a 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 commonality by 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.

Study finds supply chain predictions too optimistic

Ken Cottrell
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 cities over the last several years, however, leaves the future shape of supply chains, but also raised many questions.

Supply Chain 2020 is a multiyear effort to identify and share these resources could be problematic given that the CTL web site.

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

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 prophesizing a worthwhile activity? Singh believes it is, because it helps companies 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 course that will allow students to explore alternative approaches to college education and custom-design an entire college program to support individual needs.

The Alternative Education Seminar (SF249) is the first offering in the Experimental Study Group (ESG), the MIT undergraduate program known for its innovative, interactive 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 places in which participants are learning in different ways can help me 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 30th 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.
MIT alumna Christine Southworth’s latest composition for generator, robots, instruments and voices features some high-voltage static from the popular de Graaff 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, 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, a product of MIT’s Science and Technology education and built at MIT in the 1950s by MIT Professor Robert 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 demonstrations of lightning and electricity.

“Zap!” is an offshoot of a project started by Assistant Professor of Electrical Engineering and S.B. Electrical Engineering 2001, Michael Gordon, Louis Andriessen, Sachi Sato (keyboards), Blake Newman (bass), Erik Shapiro, said “This music doesn’t break the rules; it rather renders the rules obsolete.” I like that.

Why a Van de Graaff generator?

Southworth and Alexandra Andersson (S.B. Electrical Science and Engineering & S.M. Electrical Engineering and Computer 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 Theremin, that she calls a “termenova.”

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

Other contributors to the project include: Mike Meyers (sound engineer/programming), 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 Eborota 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.

Ensemble Robot was born. With generous support from the L.E.F 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 Cavotastra mentioned the Van de Graaff generator and this project just exploded into being.

How did you get the idea for this project?

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 idea with my notation than anything else, but I thought it was amazing to be able to play electronic music, as a robot. My friend Liesl Hasan builds robots, so soon after that we started applying for grants to make this happen, and

ARTS

Southworth makes music outside the rules

STUDENT POSITIONS

PHOTO / EVAN ZIFRONY

“Zap!” composer Christine Southworth (S.B. 2002) poses with the Van de Graaff generator that creates 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 and human voices.
Go Online! For complete events listings, see the MIT Events Calendar at: http://events.mit.edu.


MIT EVENT HIGHLIGHTS
FEBRUARY 2 - 6

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

Quintessential Brass

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

Go Online! If you have an MIT email address, use the MIT Events Calendar Web form to save events to your calendar, view your calendar, and obtain event-specific information.

CALENDAR

THE INTERNATIONALIST

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

TSUNAMI BENEFIT CONCERT

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

WOMEN’S STUDIES SYMPOSIUM

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

THE TRAVELING FILM SPORTS

A kickboxing event in conjunction with the current exhibition “The Clipper Ship Era.” 7:30pm. MIT Museum. 253-4444.

THE CLIPPER SHIP ERA

Exhibition focused on the design, construction, speed and social experience of the clipper ships era. MIT Museum. Noon-5pm. 253-4444.

THE CRUSADER

Tuesdays: 7pm. 2pm. List Visual Art Gallery. 253-4880.

TUESDAY
February 7

Blood Drive
Sponsored by MIT’s American Red Cross Team and Network. Feb. 7 and 9, 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 N22, 390-452-2484.

Tax workshops
Kickoff to tax workshops taking place in February and April. Cambridge City Hall, 2-5pm.

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.

MONDAY
February 7

What Does a Martian Look Like?
Lecture by Dr. Jack Cohen, professor of mathematics, Warwick University, UK, and an internationally recognized bioreproductive biologist. 6pm. Room 32-133.

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

The Doing of the Line
Dancing, with Bruce Nye. 7:30pm. 253-3982.

Chicks Make Flicks: Cynthia McKeeen Talk and showing of Cynthia McKeeen’s film, “One is Eight: Jancie’s Journey.” 7pm. Room 32-134. 253-4880.

Inoblast Breackdance Practicing
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.

Turkey Trotting at Bowdoin College
Co-ed race over Valentine’s Day weekend. 3pm. Harpsichord Sahin Lecture Series.

American Power: Water, A Different Affectation
Lecture by Thomas A. Keany, Executive Director of the Foreign Policy Institute at Johns Hopkins University. Discusses American air power. Noon. E38, 6th Floor Conference Room. 253-4092.

STUART
February 10

MIT Chapel Concert

Sahin Lecture Series

GALLERY TALK BY HANNAH FLECKENSTINE


FRIDAY
February 11

MIT Women’s Studies 20th Anniversary Panel discussion with alumns 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.

MIT Anime Club Weekly Meeting
7pm. List Visual Art Gallery. 253-4880.

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.

TOURS

MIT’s American Red Cross Team and Network. Noon-5pm. 253-4444.

VARSITY’S MUSICAL "MUSICAL REVUE": TRIPLE MATCH vs. ROYER

Tickets available at the Student Center, 11am-6pm.

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

Wlobelt Dining Hall (2nd floor). 253-FOLK.