Bulletin of the

Connecticut Academy of Science and Engineering

Volume 23,2 / Summer 2008

ENGINEERS WITHOUT BORDERS

"Building a Better World, One Community at a Time"

Last year, the 200 students at the girls primary school in Abheypur, India, had no access to water—especially trying conditions during the hot months of the year when temperatures average 94°F with 70 to 80% humidity. Many of Abheypur's 3400 villagers rely on only two hand-pump wells and two electric wells, though electricity supply is limited to a few hours a day. Thus village women and girls spent much of their day collecting water for their families.

In January 2008, villagers welcomed the University of Hartford (U of H) Chapter of Engineers without Borders (EWB) and helped them build a solar-powered groundwater pump system at the school that can supply as much as 9,000 gallons of potable water per day.

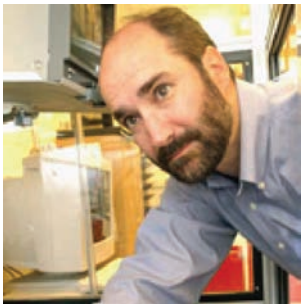
EWB team member Rachel LaDue, a mechanical engineering major, called the value of her experience "vast and multi-directional," citing the opportunity to work on a real-world application of her studies and to help and learn from people of a different culture.

Engineers without Borders-USA (EWB-USA) defines itself as a non-profit humanitarian organization that partners with developing communities around the world to improve their quality of life. The US branch of EWB was created in 2000. There are now over 200

(EWB, page 2)

Two Yale Scientists Awarded Prestigious CT Science Medals

Two Yale University scientists—CASE members Michael P. Snyder and Tso-Ping Ma—have been awarded the state's highest scientific honors, the Connecticut Medal of Science and the Connecticut Medal of Technology.



Michael P. Snyder

Snyder Awarded 2007 Medal of Science

The 2007 Connecticut Medal of Science was awarded to CASE member Michael P. Snyder, Lewis B. Cullman Professor of Molecular and Cellular Biology and professor of molecular biophysics and biochemistry at Yale University and director of the Yale Center for Genomics and Proteomics. Snyder accepted the medal at the May 21, 2008 annual dinner of the Connecticut Academy of Science and Engineering.

Snyder's early research studied how cells determine the direction to grow and divide. His laboratory determined the basic mechanisms by which these processes occur, which is important for understanding the formation of specialized cell shapes and tissues. His most influential research is in the area of genomics and proteomics, in which he is a pioneer. His laboratory was the first to initiate gene characterization on a large scale, demonstrating for the first time that it was possible to analyze thousands of genes and proteins at once. This work spawned the functional genomics field in which large number of genes and proteins are analyzed simultaneously, and became the foundation for what many now call "systems biology."

More recently, Snyder's research has involved working with human embryonic stem cells; his laboratory was the first in Connecticut to do so. His laboratory discovered a novel signaling pathway important for embryonic stem cell self-renewal and used this information to make one of the first growth media free of animal components. These efforts are considered important for ultimately using human embryonic stem cells for therapy.

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News from the National Academies

The following is excerpted from press releases of the National Academies and from Infocus Magazine (www.infocusmagazine.org), a news resource of the National Academies.

◆ Climate Change and the US Transportation Infrastructure

A new report from the National Research Council warns that while every mode of transportation in the nation will be affected as the climate changes, potentially the greatest impact will be flooding of roads, railways, transit systems, and airport runways in coastal areas because of rising sea levels and more intense storm surges.

The impacts of climate change are certain to be widespread and costly, the report warns, and will require significant changes in the planning, design, construction, operation, and maintenance of transportation systems.

The report identified five climate changes of particular importance to US transportation: 1) increases in very hot days and heat waves; 2) increases in Arctic temperatures; 3) rising sea levels; 4) increases in intense precipitation events; and 5) increases in hurricane intensity.

A number of other contributing factors are likely to lead to vulnerabilities in coastal-area transportation systems, including population growth and erosion and loss of wetlands, which form crucial buffer zones.

The report calls for the federal government to have a strong role in implementing many of its recommendations, but urges local governments and private infrastructure providers to begin to identify critical infrastructure that is particularly vulnerable to climate change. Professional organizations can single out examples of best practices, and transportation planners and climate scientists can begin collaborating on regional scenarios for likely climate-related changes.

[http://books.nap.edu/catalog.php?record_id=12179]

(National Academies, page 7)

established and developing chapters of EWB-USA nationwide, seven of them in Connecticut.

Liz Mitchell, a mechanical engineer with Pratt & Whitney, is a founding member and president of the Hartford Professionals Chapter (HPC). Mitchell says they try to operate according to the chapter's motto, "Building a Better World, One Community at a Time."

"We realize more and more every day how lucky we are and that realization spawns a desire to help others achieve both a higher level of education and modern conveniences, like clean running water and a house with a roof and electricity," Mitchell said. "Our projects afford us the added benefit of not only helping people, but of prioritizing the use of sustainable technologies so that our environmental impact is minimal."

The *BULLETIN* of the Connecticut Academy of Science and Engineering is published by the Connecticut Academy of Science and Engineering, Inc., 179 Allyn Street, Suite 512, Hartford, CT 06103-1422. Telephone and fax: (860) 527-2161. E-mail: acad@ctcase.org. Web site: www.ctcase.org. To subscribe to the Bulletin, contact us by phone or email or subscribe on our web site.

The Connecticut Academy of Science and Engineering is a private, nonprofit public-service organization established by Special Act No. 76-53 of the Connecticut General Assembly.

The Hartford Professionals Chapter develops its own projects while also mentoring student chapters at the U of H and Central Connecticut State University (CCSU). They also provide judging for events of the Connecticut Pre-Engineering Program (CPEP) and the Connecticut Invention Convention. The chapter participates in a minimum of two Habitat for Humanity work events annually and is currently at work on phase two of a rainwater catchment system at the Samuel J. Green Charter School in New Orleans.

Connecticut's New London County (NLC) Professional Chapter is still "getting its feet wet" according to president Meggan Harris-Miller, a Pratt aerospace engineer. Miller says the NLC chapter is more domestically focused, with projects involving a community garden and sustainable housing for local homeless veterans.

In partnership with Hartford Professionals, CCSU EWB is working to bring a Closed Circuit Television security system to Hartford's Upper Albany neighborhood in conjunction with the Upper Albany Main Street Society. Chapter president Jack Glanzrock, a mechanical engineering major, said they are also looking at a clean water project in Jamaica and, closer to home, solar power for the campus greenhouse. Glanzrock said the solar power implementation will help raise the group's profile on campus, while also providing hands-on experience in sustainable technology that can be used in future projects.

Other EWB student chapters in Connecticut are at Yale University and the University of Connecticut. In the earlier stages of the Abheypur project, Wesleyan's EWB chapter—though lately inactive—participated by conducting a sociological survey of the village. UConn's chapter, in its first active year, received project approval from EWB-USA for a road restoration project in Nicaragua. Chapter president Nathan Barlow, a chemical engineering major, said the group is also working through a non-governmental organization (NGO) in Thailand on a project that includes work with natural pesticides, solar power, catfish fisheries and adobe house development. Yale's EWB chapter completed its first international project in 2006 with the construction of a water collection system in El Rosario, Honduras. Currently focused on a clean water project in Cameroon, the group traveled to the village of Kikoo in August 2007 to begin the first phase of construction for a gravity-fed water distribution system, designed by Yale engineering students and professional mentors.

The success of a project depends on many variables and the project may take years from conception to completion—especially for the more complicated international ones. Projects are subject to a rigorous approval process by EWB-USA. Rosemary Powers, EWB-USA's chapter relations manager for the Northeast, says the application process is designed to ensure that a project meets EWB's mission and that it benefits the community and not the individual.

"We look into whether the local chapter has talked to the community to determine who is going to own the project after the EWB team is gone and how it is going to be maintained," Powers said. "If a community needs some education, they have to provide that before they leave." EWB's Technical Advisory Committee (TAC) later reviews project design for quality of work and its appropriateness to the site.

David Pines, U of H associate professor and chair of the Department of Civil, Environmental and Biomedical Engineering and a frequent CASE study manager, is faculty advisor to his school's student chapter.

"It's crucial to incorporate the villagers as an active partner in the project because they have a wealth of information to share about

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Business & Industry

PRATT TO SUPPLY NEW TYPE OF ENGINE FOR MITSUBISHI AIRCRAFT. All Nippon Airways' new Mitsubishi Regional Jets will be powered by **Pratt & Whitney Aircraft's** new Geared Turbofan™ engines. All Nippon placed the first order in late March for 15 of the jets, which will have two engines and carry 70-90 passengers. The development cost for the engines, which are expected to deliver double-digit reductions in emissions, fuel usage, noise, and operating costs, is estimated at $1.5 billion. The first deliveries of the jets could come as early as 2012.

ELECTRIC BOAT REINSTITUTES REGIONAL APPRENTICE PROGRAM. **Electric Boat** is in the process of hiring about 200 engineers and 400 designers for design of its Virginia-class submarines and for conceptual work on a new destroyer and aircraft carrier. In addition to recruitment at about 75 colleges, EB will reinstitute an apprentice program at the region's high schools and technical schools.

CT UTILITIES SUBMIT PROPOSALS FOR NEW POWER PLANTS. **Connecticut Light & Power** has submitted a proposal to the state **Department of Public Utility Control (DPUC)** for quick-starting power plants in Waterbury and Lebanon, and **United Illuminating** has submitted a proposal with New Jersey-based NRG Energy, Inc. If either is accepted, it would mark the return of the state's utilities to power generation. Several other companies are competing for approval of the so-called peaking plants. The DPUC expects to choose from the proposed projects by July.

HIGH-TECH EXPORTS GROW. Continuing a four-year trend, Connecticut's commodity exports increased more than 12% last year. Exports totaled about $13.7 billion in 2007, up from about $12.2 billion in 2006. Led by industrial machinery and products, aircraft and spacecraft parts, plastics, and instruments used in the optic, photo, and medical fields, the exports go primarily to Canada, France, Germany, Mexico, and the United Kingdom. Exports to China increased almost 53% between 2006 and 2007.

KODAK TO ACQUIRE STAMFORD SOFTWARE FIRM. **Eastman Kodak** announced plans to acquire **Design2Launch, Inc,** a Stamford software firm. Founded in 1999, Design2Launch, Inc. provides software for the pharmaceutical, food, automotive, and consumer-packaging industries.

CARBON EMISSION ALLOWANCES UP FOR BID. A consortium of 10 states, including Connecticut, will hold an auction of carbon emission allowances on September 10 as part of a plan to reduce greenhouse gas emissions from power plants. Auctions will then be held quarterly and power plant operators will have until 2011 to acquire credits to cover all of their carbon emissions. At the same time the volume of emissions will be reduced by 10% over 10 years.

Communication

LIEBERMAN WEBSITE CRASH DUE TO TECHNICAL ISSUES. The Federal Bureau of Investigation (FBI) has concluded that the crash of **Senator Joe Lieberman's** website on the eve of the Democratic primary in August 2006 was due to a an over-utilized and misconfigured server and not the result of hackers. The FBI office in New Haven found no evidence that the site had been the subject of a denial of service attack. According to an FBI memo, the site crashed because the configured limit of 100 emails per hour was continually exceeded the night before the primary.

STATE LAPTOPS NOW ENCRYPTED. More than 6,000 state laptop computers have been encrypted to enhance computer security after the theft of a laptop in New York State that had the social security numbers of more than 100,000 Connecticut taxpayers on it. The state purchased 24,000 additional encryption licenses for use on other devices and desktop computers. The product, Safeboot, was selected by the state **Department of Information Technology** and an inter-agency working group.

COMMUNICATION POLE OWNERS ORDERED TO MAKE FIBER-OPTIC CONNECTIONS. The state **Department of Public Utility Control (DPUC)** has ordered communication pole owners, mostly AT&T, Connecticut Light and Power, and United Illuminating, to do work necessary to make fiber-optic connection for cable and voice broadband providers within 70 days. The DPUC plans to monitor compliance through October 17.

CONVICTION DATABASE NOW ONLINE. More than one million criminal convictions are now online in Connecticut. All criminal and motor vehicle cases disposed of either by conviction or bond forfeiture order since January 1, 2000, are included in the database, which is searchable by last name and birth year, court location, and category. Misdemeanors would be removed after five years. Use of the database, which is available at www.jud2.ct.gov/crdockets/searchbydefdisp.aspx, is free.

Education & Cognition

ONLINE PROGRAM TARGETS HIGH SCHOOL STUDENTS INTERESTED IN HEALTH CAREERS. **Three Rivers Community College** in Norwich has offered an online program for about 40 high school students interested in careers in allied health. The program for students at seven high schools in eastern Connecticut includes summer internships at a local hospital. It is funded by a $105,000 grant from the Youth Pipeline Project, which is sponsored by the state **Department of Public Health** and the **Office for Workforce Competitiveness**.

COMPUTER-ASSISTED DRUG THERAPY SHOWS SUCCESS. Drug abusers who used a computer-assisted training program in addition to traditional counseling avoided drugs significantly longer than those who received counseling alone, according to a **Yale University** study. The computer-assisted therapy program consisted of text, audio, and videotaped examples designed to help the user learn new ways of avoiding the use of drugs and changing other problem behaviors.

YALE NURSING TO STUDY INTERNET EDUCATION OPTIONS FOR DIABETIC KIDS. The National Institute of Nursing Research has awarded the **Yale School of Nursing** $3.4 million to compare the effectiveness of internet-based coping skills training versus an

Items that appear in the In Brief section are compiled from previously published sources including newspaper accounts and press releases. For more information about any In Brief item, please call the Academy at (860) 527-2161, write the editors at CASE Bulletin, 179 Allyn St., Suite 512, Hartford, CT 06103-1422, or email us at acad@ctcase.org

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internet education program for diabetic children. The education program provides age-appropriate information about healthy eating, exercise, and preventing and managing sick days for youth with type 1 diabetes. The teen coping skills program provides information and exercises to assist teens with social problems and allows teens to interact with others in the program. The websites are only available to program participants.

Energy

RBS BUILDING TO BE LARGEST GREEN BUILDING IN STATE. The $500 million **Royal Bank of Scotland** building along Interstate 95 in Stamford will become the largest environmentally responsible building in Connecticut. The 12-story, 500,000 square-foot structure was designed by Westport-based **Roger Ferris & Partners** with input from the US Green Building Council. The plans reduce construction waste, and will produce low greenhouse emissions and utilize efficient water and energy systems. Plans call for a one-acre rooftop garden and a 70,000-gallon basement unit to reclaim water for other uses.

BROADWATER REJECTED. On April 10, New York Governor David Paterson announced his rejection of a plan by Broadwater Energy to build a floating liquefied natural gas (LNG) terminal nine miles off the coast of Long Island. Many groups in Connecticut and New York opposed the project, including **Governor Jodi Rell** and the Task force she assembled to study the proposal. The Task Force report cited negative environmental effects and highlighted more cost effective and less damaging energy alternatives. Broadwater (a joint venture of Shell Oil and the TransCanada Corporation) announced that it would appeal to the US Commerce secretary.

NEW TECHNOLOGIES FOR SEABED CABLES. A joint project of **Connecticut Light & Power** and the **Long Island Power Authority** to replace 11 miles of aging cables under Long Island Sound between Norwalk and Northport, NY, has been completed. The $140 million project used new technology to bury the cables as much as 6 feet below the seabed in waters as deep as 200 feet.

STAMFORD POLICE GET NEW RULES TO SAVE FUEL. To reduce gasoline usage, the **Stamford Police Department** is requiring officers to walk their beats more often and banning them from idling cars. In addition, the department is using two-officer cars more often to cut gasoline usage.

TRI-GENERATION SYSTEM POWERS BRANFORD SCHOOL. **Branford High School** has become the first school in Connecticut to generate most of its own energy. The $1 million tri-generation system produces power, heat and air conditioning. The natural gas-fired system was manufactured and installed by **United Technologies** affiliate **UTC Power** of South Windsor. The plant makes electricity and the waste heat it produces is used for hot water, heating, and air conditioning.

Environment

WEST NILE VIRUS STILL PRESENT. During 2007 the West Nile virus was found in 69 of about 160,000 Connecticut mosquitoes collected, identified and tested. Jamestown Canyon virus was found in 42, and Eastern Equine Encephalitis virus in 5. Twenty-five scientists and other staff of **The Connecticut Agricultural Experiment Station** conduct the statewide surveillance program annually. During 1999, Station scientists were the first to culture the West Nile encephalitis virus from North American mosquitoes, and have since identified the major mosquito vectors of West Nile virus in Connecticut. They found that the American robin is an important carrier of the virus. *Culex salinarius*, a mosquito that breeds in brackish and fresh water, is the probable "bridge vector," moving the virus from birds to mammals. A guide to identification of mosquitoes, frequently asked questions about West Nile virus, and the 2007 results are at http://www.ct.gov/caes/cwp/view.asp?a=2819&q=377446.

RESOLVING A GLOBAL WARMING MYSTERY? According to computer models and basic scientific principles, temperatures several kilometers above the Tropics should warm faster than on the surface or at the Poles. However, temperature readings taken from weather balloons and satellites have shown little if any warming aloft. A team of Yale researchers led by **Robert J. Allen** and **Steven C. Sherwood** of Yale's **Department of Geology and Geophysics** theorized that the thermal winds tied to temperature fluctuations would more accurately gauge warming aloft than direct temperature measurement. In a study published in the journal *Nature Geoscience*, they reported that their estimates from thermal winds indicated the atmospheric temperatures near 10 km in the Tropics rose about 0.65° C. per decade since 1970, different from more direct temperature measurements and in line with predictions of global warming models.

CONSORTIUM GETS NOAA GRANT. A consortium of the **University of Connecticut, NOAA laboratory** in Milford, and the **Mystic Aquarium and Institute for Exploration** has received a $500,000 grant from the National Oceanic and Atmospheric Administration (NOAA) to hire three post-doctoral fellows and a graduate student to assist with research on how oceans affect human health.

MINOR QUAKE RECORDED. A magnitude 2 earthquake occurred on March 11 with an epicenter 3 miles northwest of the center of **Chester**. It was felt in **Chester, Essex, Deep River,** and **Killingworth**. It occurred at a depth of about 1.8 miles below the surface, according to the US Geological Survey. The last earthquake of a similar magnitude in Connecticut occurred on November 3, 1968, and was felt from Madison to Chester.

COALITION WARNS STATE WILL MISS AIR POLLUTION GOAL. The **Connecticut Climate Coalition** reported that Connecticut will likely miss its goal of cutting air pollution to 1990 levels by the end of the decade, largely due to vehicle pollution. The coalition said vehicle pollution increased by 20% from 1990 to 2005 due to a number of factors. Pollution from industrial sources declined by 8.5% between 2001 and 2005. Emissions from electric power plants was reduced by 12.2% between 1990 and 2005.

FULL AUTO TAX CREDIT FOR FUEL EFFICIENT CARS. The **Town of Orange** has become the first Connecticut town to offer a full motor vehicle tax abatement to residents whose automobiles have at least a 40 mile-per-gallon rating for city driving.

ENVIRONMENTAL COUNCIL ADVISES MORE SPENDING. A report by the state's **Council on Environmental Quality** recommends that the state should be spending about $190 million per year on parks and environmental protection. The report said for the past five years, spending on land conservation, clean water, recycling, and state park repairs was less than one-third the annual amount required. The report recommends

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spending at least $15 million per year for farmland preservation and setting aside 10,000 acres annually for open space.

Food & Agriculture

NORWALK FIRM GETS GATES FOUNDATION GRANT. Norwalk-based **TechnoServe** has received a $46.9 million grant from the Bill & Melinda Gates Foundation to help thousands of small-scale coffee farmers in East Africa improve the quality of their coffee and enhance their income. Advisors will assist the farmers in Kenya, Rwanda and Tanzania in marketing as well as train them in ways to improve coffee production and processing efficiency.

AG STATION ACQUIRES FORMER DEP FOREST NURSERY. The Connecticut Agricultural Experiment Station has taken title to the former **Department of Environment Protection** forest nursery in Voluntown. The location—which will give the Experiment Station a permanent presence in eastern Connecticut—will be used for research on crops and monitoring and research on mosquito-borne pathogens such as Eastern Equine Encephalitis. The Station also received approval from the state **Bond Commission** for repairs at its New Haven facility.

LONG ISLAND SOUND GROUP HEARS GOOD, BAD NEWS IN REPORTS. At the 18th annual **Long Island Sound Citizen's Summit**, oyster production was reported at 135,000 bushels in 2007, up from 30,000 bushels in 2005. In addition, increased hard clam production was reported. Striped bass increased, while winter flounder and several other less popular species were reported on the decline. Lobster fishermen reported dead lobsters off the **Thames River** and as far west as the Darien shore, creating fear of a repeat of the major die-off that occurred in 1999. An abundance of lobster larvae was reported in 2007, but it could take 5-7 years to learn if those lobsters will reach maturity.

NSF GRANT BOLSTERS PLANT PROTEIN RESEARCH. The National Science Foundation has awarded $3.7 million to researchers in the **Yale Center for Genomics and Proteomics**. The grant will triple the number of plant proteins whose biochemical functions can be studied in mircoarrays. The research focuses on *Arabidopsis*, a member of the mustard family. The studies will help in understanding the interplay of genes and proteins that control plant growth and development as well as their responses to pathogens and different environmental stresses.

Health

REDUCING ER DELAYS. The state **Department of Social Services** is dispersing a $798,558 grant from the Centers for Medicare and Medicaid Services to hospitals and community health centers in an effort to reduce the average three-hour waiting time for Connecticut emergency rooms. The grant, combined with a $4.5 million appropriation from the state to community health centers to expand their hours and services, will allow hospital staff to use computers to directly book appointments at community health centers for people they have determined have non-life-threatening ailments or conditions that do not require urgent care.

SURVEY FINDS HIGH POST TRAUMATIC STRESS DISORDER IN RETURNING CT VETS. A survey has found that at least one in four Connecticut military personnel returning from Iraq and Afghanistan fit the criteria for post-traumatic stress disorder (PTSD). The study by the **Central Connecticut State University's Center for Public Policy and Social Research** and **Yale University School of Medicine** also suggested that half of the troops are reluctant to seek mental health counseling and that about half felt their health was worse after wartime deployment. In the last nine months, a state hotline received more than 300 calls from veterans or family members of veterans.

CT RESEARCHERS FIND BACTERIA MAY AGGRAVATE MS. Research at the **University of Connecticut Health Center** suggests that otherwise harmless bacteria that live in almost all humans may aggravate multiple sclerosis. **Robert B. Clark**, associate professor of immunology, said it might be possible to alter the course of autoimmune diseases such as MS, lupus, rheumatoid arthritis, scleroderma and others by eliminating specific bacteria in the mouth and gums, gastrointestinal system, and vaginal tract.

STATE RANKS HIGH IN CHILDHOOD IMMUNIZATIONS. Connecticut has the third-highest childhood immunization rate in the nation according to the Centers for Disease Control and Prevention National Center for Immunization and Respiratory Diseases. According to the CDC, Connecticut achieved 82% coverage for basic immunizations among children aged 19 to 35 months. Only Massachusetts and North Carolina ranked higher.

CHOCOLATE MAY REDUCE PREGNANCY COMPLICATION. Women who eat chocolate may be at a decreased risk of developing preeclampsia, a potentially dangerous complication of pregnancy, according to a **Yale** team of researchers headed by **Elizabeth Triche** of the **Yale Center for Perinatal, Pediatric and Environmental Epidemiology**. Preeclampsia is characterized by dangerously high blood pressure and protein in the urine. Pregnant women who suffer from the condition sometimes complain of swelling, sudden weight gain, headaches, and vision problems. Among 1,346 women with cord data available, those with higher levels of theobromine, a byproduct of chocolate consumption, had significantly lower risk of developing preeclampsia than those who had low levels.

OLDER WOMEN MORE PRONE TO DEPRESSION. Older women are more prone to depression and are more likely to remain depressed than older men, according to a study by **Yale School of Medicine** researchers. A group of 754 individuals age 70 and older received assessments every 18 months from 1998 to 2005. During the study, 35.7% of the participants were depressed at some point. Women had a higher likelihood of transitioning from non-depressed to depressed, and a lower likelihood of transitioning from depressed to non-depressed or death. "Our findings provide strong evidence that depression is more persistent in older women than older men," said lead author **Lisa C. Barry**, associate research scientist in the **Yale School of Public Health.**

High Technology

CALCULATING SUSTAINABILITY. The **Xerox Company** of Norwalk has developed a "sustainability calculator" designed to help customers save money and be energy efficient by measuring the impact of its equipment on the environment. The software measures how much energy, toner, paper, and other resources are used and the amount of waste produced by evaluating data such as the weight of the copiers, pages printed per minute, and patterns of use. A test by Northrup Grumman Corp. in Southern California cut waste and reduced the number of copiers, printers, and other office equipment in use from 2,000 to 1,100.

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LOTTERY GOES HIGH-TECH. The **Connecticut Lottery** started in January of this year to replace all of its terminals at 3,000 lottery retailers with a high-tech system that uses a combination of satellite communications, digital wireless, and DSL technology. The new system, which will replace a 10-year-old system that employs telephone lines, also has a feature which allows customers to check old tickets to determine if they are winners.

SCHOOL PROJECT YIELDS SOFTWARE BREAKTHROUGH. An independent study project at **Cheshire Academy** has led to development of a software program that allows YouTube users to download videos to iPods, iPhones or Apple TV. The product debuted at the MacWorld 2008 Conference in February. The program, which involves more than 10,000 lines of code for the Mac OS X version, was developed by **Jesse Youngblood,** a 17-year-old Cheshire Academy student, in conjunction with security software firm **Gridlock LLC** of Wallingford. The project began as research into a way to compress security camera video, but Youngblood soon discovered that any kind of video could be compressed.

STATE AWARDS STEM CELL GRANTS. Over $9.5 million in state grants for stem cell research were awarded this spring to **Yale University** and the **University of Connecticut (UConn)** by the **Connecticut Stem Cell Research Advisory Committee.** Yale received $6.4 million and UConn $3.3 million. The supported research is geared towards translating advances into clinical treatments. The grants include $1.8 million to maintain and enhance Yale's human embryonic stem cell core facility and $900,000 to establish a core facility at UConn.

Transportation

RUNAWAY TRUCK RAMP OPENS. The state **Department of Transportation** has opened a $2.8 million runaway truck ramp on Route 44 in **Avon** two years after an out-of-control dump truck struck several vehicles, including a commuter bus, killing four people. The ramp includes a retaining wall, a concrete barrier curb, and a system of fiber nets designed to safely stop a truck.

STREETCARS FOR NEW HAVEN. A study conducted in **New Haven** estimates it would cost about $30 million to build 3.6 miles of streetcar tracks and about $2 million a year to operate a proposed streetcar loop on existing roads. New Haven's last streetcar lines shut down on September 25, 1948.

RAILCAR OVERHAUL STUDIED. Metro-North Railroad is studying ways to overhaul its 54 M4 cars to improve reliability. Performance of M2 cars—a decade older than the M4 cars—has increased since the Metro North's Critical System Replacement Program started in 2003. The rehabilitated M2s outperformed the M4s in the first two months of the year, averaging 202,719 miles without a failure, compared with 135,746 for the M4s.

NH RAIL YARD COSTS. The estimated cost of a 70-acre rail maintenance facility in **New Haven** has risen to $1.1 billion. Plans for the rail yard, including a pedestrian bridge, parking garage, and warehouse facility will have three phases and stretch out past 2020. Project estimates were $300 million in early 2005, and $732 million in January 2008.

—Compiled and edited by Paul Gough

Medals (from page 1)

Snyder received his PhD from the California Institute of Technology and did postdoctoral work at Stanford University. He is a member of the board of directors of the Genetics Society of America and is the president of the US Human Proteome Organization. He sits on many international advisory boards and was a co-founder of Protometrix, Inc.

T. P. Ma Honored with 2008 Medal of Technology

Tso-Ping Ma

The 2008 Connecticut Medal of Technology was awarded to CASE Member Tso-Ping Ma, the Raymond John Wean Professor of Electrical Engineering at Yale University. Ma also serves as chairman of the Department of Electrical Engineering, and a co-director of the Yale Center for Microelectronic Materials and Structures. He is also a professor of applied physics.

Early in his career, Ma did research at IBM on advanced silicon device technology and ionizing radiation effects in metal oxide semiconductor (MOS) devices. He joined the Yale faculty in 1977, where his research and teaching have focused on microelectronics, semiconductors, MOS interface physics, ionizing radiation and hot electron effects, advanced gate dielectrics, flash memory device physics, and ferroelectric thin films for memory applications.

Ma's research has had a major impact on the high-tech industry and his students have gone on to leadership positions in the semiconductor and computer hardware field. He has served as the principal investigator of joint R & D projects with numerous companies worldwide, including IBM, Intel, Motorola, Lucent Technology, GE, Hughes, Rockwell Semiconductors, Philips, Siemens, Hitachi, Toshiba, and Mitsubishi Electric.

Ma is a patent holder, co-editor of a book, the recipient of numerous awards and honors, and has contributed to several book chapters as well as over 180 research papers. He is an honorary professor at the Chinese Academy of Sciences, and an honorary guest professor at Tsinghua University, Tianjin University, and Shandong University.

A graduate of National Taiwan University, Ma received his PhD from Yale. He has been actively involved in several conferences of the Institute of Electrical and Electronic Engineers (IEEE), Solid State Devices and Materials (SSDM) and the Electro Chemical Society, to name a few. He also served as a founding member and chairperson of the Connecticut Microelectronic and Optoelectronic Consortium (CMOC).

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the materials and techniques that are available to them to maintain the system after the EWB team has left," Pines said. "Although we were on a tight schedule to complete the project in two weeks, you cannot underestimate the importance of taking the time to have tea two, three, or four times a day."

The U of H and Hartford Professionals chapters are collaborating to further the work in Abheypur. Another implementation trip is planned for this August to connect the water storage tanks at the girls school to the lower caste community, which does not have easy access to water, as well as rehabilitate two of the non-working public wells.

Fundraising for projects is key and is left to a local chapter's own ingenuity. The U of H and Hartford Professionals chapters held a joint fundraising dinner in April which included presentations about past and upcoming projects. UConn's project in Nicaragua to stabilize a key access road linking Granada to an area called La Prusia will require some $20,000 in funds for equipment rentals, local labor and travel. Barlow said fundraising for the chapter has been a challenge—due in part, he thinks, to their relative newness. Yale EWB cites a network of family, friends, local engineering firms, Yale alumni and travel fellowships from Yale University as sources of support.

University of Hartford engineering professor David Pines talks with women from the village of Abheypur, India through a translator, at right, during a January 2007 assessment trip for the U of H Engineers without Borders chapter. In January 2008, Pines' student team installed a solar-powered groundwater pump system for the village. [Photo courtesy of David Pines]

In the case of the solar-powered pump system in Abheypur, the majority of funding came from Pratt & Whitney and the University of Hartford's Women's Education Leadership Fund

(EWB, page 8)

From the National Academies (from page 1)

◆ New Approach to Effective Health Care Urged

A new report from the Institute of Medicine urges establishment of a single entity with the authority and resources to help consumers sort through massive quantities of medical data and research, some of it contradictory, in order to identify reliable information about their healthcare options, including which treatments are appropriate for their conditions and circumstances. The report provides a blueprint for a national program to prioritize which clinical services should be evaluated and to conduct systematic reviews of the evidence. This program would also be responsible for developing and promoting rigorous standards for clinical practice guidelines.

The report proposes that the secretary of the US Department of Health and Human Services establish this program under the direction of Congress, which must see that the program is given the necessary authority, expertise, and funding. The new program must be established in a way that ensures transparency, objectivity, and scientific rigor, so that stakeholders and the public regard it as an authoritative and trustworthy resource. To help ensure objectivity and accountability, the report recommends that an independent, free-standing committee be created to advise the program and that an advisory board be established to provide broad oversight.

[http://books.nap.edu/catalog.php?record_id=12038]

◆ Water Implications of Increased Biofuel Production

Corn-based ethanol has been at the forefront of the "green" movement as a viable alternative to fossil fuels. Last year, the Bush administration called for the production of more ethanol, raising the question of how this agricultural shift will impact water supplies and other resources.

A National Research Council committee found that such a shift would likely lead to adverse effects on local water sources and water quality if new practices are not put into use promptly. Expanding corn and other biofuel crops into regions with little agriculture, especially dry areas, could change current irrigation practices and greatly increase pressure on water resources. Water consumed at biorefineries during the ethanol production process could also diminish local water supplies, the report says. More crops also means increased use of fertilizers and pesticides, which would impact the water quality of groundwater, rivers, and coastal and offshore waters. Higher levels of nitrogen, as well as phosphorus, from fertilizers washing into streams could also lead to low-oxygen or hypoxic bodies of water, commonly known as "dead zones," which are lethal for most creatures.

[http://books.nap.edu/catalog.php?record_id=12039]

◆ Wake Turbulence A Challenge in Crowded Skies

The Next Generation Air Transportation System, or "NextGen," is an interagency federal effort to accommodate increasing demand for air travel, which is expected to double or even triple by 2025. One goal of NextGen is to take advantage of GPS to safely permit planes to fly more closely spaced. Unfortunately, GPS does not solve the problem of wake turbulence, the counter-rotating vortex of air that trails aircraft and is a danger for planes, especially smaller ones, flying too close behind. The FAA's current standards for how close planes can fly to each other at a similar altitude, or between takeoffs and landings, are based on size.

A National Research Council committee found that the current separation requirements prevent taking full advantage of GPS and other technologies that would allow closer flying. While wake turbulence is not the only obstacle to increased air capacity, the committee concluded that a robust wake turbulence R&D effort is needed to maximize the air transportation system's efficiency.

[http://books.nap.edu/catalog.php?record_id=12044]

CT Science Center Update

Design of the Science Center's 200+ exhibits was completed in mid 2007. Fabricators are now at work constructing the various exhibit components. Multi-media firms are also busy creating the videos, exhibit touch screens, interactive games, and much more. Recently, film crews were developing a video for the Invention Dimension Gallery showcasing the work of Connecticut scientists.

Construction on the new Science Center building continues at a brisk pace. Enormous glass and metal wall panels are going up, utilities systems are installed, and concrete floors poured. Details of the progress can be viewed in our latest WFSB Channel 3 project update available at CTScienceCenter.org. Work on the Magic Carpet roof continues, with a distinctive—and highly scientific—method to provide supplemental support for the east side cantilever using a new cable stayed-type of system. A cable-stayed system draws on the same engineering principles used on many bridges to support long, horizontal structures.

The projected opening of the Science Center is now planned for late spring 2009.

EWB (from page 7)

(WELFund). Also key was the work of David Cooley, a U of H MBA graduate and an executive with Evalueserve, a global business research and analytics firm. Cooley donated his own funds and company time to the project. Nadia Glucksberg of MACTEC Engineering and Consulting, which has many Connecticut clients, served as a hydrogeologist on the project and took vacation time to accompany the U of H team on their January 2008 implementation trip.

U of H adjunct professor Subhash Chandra, an HPC member and Westinghouse Electric Corp. executive, first brought Abheypur to the attention of the U of H chapter. Chandra believes fundraising on a project by project basis is not the most efficient way to see EWB projects through to completion.

"This is just one little village in India. These types of projects are needed all over the world. My ideal will be to create a sustainable program that brings the professionals and the universities in the area together to do these projects," Chandra said. "The second goal would be to work with foundations and private financing to make these projects replicable and sustainable."

The only restrictions placed on funding by EWB-USA is that donations made for a specific project must be used for that project and cannot be re-allocated for other uses. Chandra envisions endowments, with the appropriate controls in place, so that faculty advisers or professional chapter officers could know at the beginning of each year what funding is available and raise additional funds per project as needed.

"You build up on this one success. For that we need the support of the corporate community," said Chandra.—***Ann Bertini is assistant director for programs for the Connecticut Academy of Science and Engineering.***

To learn more or to become a donor or corporate sponsor, see

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