

Bulletin of the

CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING



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Activities of the Academy

Following is a list of the most recent major reports of the Academy. Reports are available for a nominal fee from the Academy office or web site; executive summaries of the most recent reports are available on the Academy web site at www.ctcase.org.

"A Study of Railcar Lavatories and Waste Management Systems" (2004)

"Study Update: Bus Propulsion Technologies Applicable in Connecticut" (2003)

"A Study of Fuel Cell Systems" (2002)

"A Study of Bus Propulsion Technologies Applicable in Connecticut" (2001)

"Study of Radiation Exposure from the Connecticut Yankee Nuclear Power Plant" (2000)

"Efficacy of the Connecticut Motor Vehicle Emissions Testing Program" (2000)

"Indoor Air Quality in Connecticut Schools" (2000)

"Efficacy of MTBE Use in Connecticut" (1999)

"Radon in Connecticut: Quantitative Perspectives about Effects on Public Health" (1998)

"Building Agricultural Biotechnology in Connecticut" (1997)

"Status of Connecticut Critical Technologies" (1997)

"Evaluation of Critical Technology Centers" (1996)

A New Initiative to Promote Interest in Math and Science

Imagine that an adult or child in your family is interested in playing soccer or the violin, so you ask your neighbors and co-workers for recommendations. Quickly you have the names, internet addresses and telephone numbers of local age-appropriate opportunities — some very competitive, some more recreational. Within a day or two, you have several options from which to choose.

Now imagine that the same person is interested in math-, science- or engineering-related activities. Try finding age-appropriate opportunities in the state, let alone in your local area. It's not so easy. Excellent programs exist in some areas, but there are gaps in the services provided and existing programs aren't widely publicized or linked to other similar venues. The Connecticut Academy of Science and Engineering (CASE) wants to change that.

"About six years ago, the CASE governing council decided that it was critically important for the economic health of Connecticut to proactively engage the public, especially our young people, in science and technology," said Michael J. Werle, president of CASE. "Rather than sit back and watch, we needed to find a way to engage people in science and technology."

Creating demand

This effort has taken a unique approach to the problem of technological literacy. "We were prompted by a very insightful consultant to study the wonderfully successful infrastructure that supports sports and art programs in our local communities," Werle said. "We realized that with a similar support structure, broad exposure and aggressive promotion, we might be able create similar demand for science and technology-based programs."

CASE developed a new, broadly-based advisory group to guide the development of a new Initiative for Science and Technology aimed at addressing the problem of the low number of people within the general public who are sufficiently literate technologically. As part of the Initiative, a number of Connecticut's leaders spent years studying the existing science,

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News from the National Academies

The following is excerpted from press releases of the National Academies and from *Infocus Magazine*, a news resource of the National Academies, which can be found online at www.infocusmagazine.org.

◆ Composition of Altered Food Products Should Be Basis for Federal Safety Assessment

A new report from the National Research Council (NRC) and the Institute of Medicine (IOM) urges federal agencies to assess the safety of genetically altered foods on a case-by-case basis before their commercial release, regardless of how the foods were produced (i.e., by genetic engineering or by other techniques, such as conventional breeding for desirable traits), in an effort to determine whether unintended changes in their composition could adversely affect human health.

Because even traditional methods such as cross-breeding can cause unexpected changes, the scope of such safety evaluations should not be based solely on the technique used to alter the food, the report advises. The report suggests that foods containing new compounds or unusual amounts of naturally occurring substances, regardless of the method used to create them, be subject to greater scrutiny.

The term "genetic modification" is used in the IOM report to describe the broad array of techniques — from traditional cross-breeding to genetic engineering to the use of chemicals or radiation — used to alter plant and animal traits that can be inherited from one generation to the next. "Genetic engineering" refers to a specific type of alteration that uses molecular biology techniques to delete genes or to transfer genes for particular qualities from one species to another.

While genetic engineering is not an inherently hazardous process, the report notes, the resulting food, along with foods created from other methods of genetic

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Initiative (continued from page one)

math and engineering offerings available throughout the state. About three years ago, they developed the first concept for a supportive infrastructure and have been refining it ever since.

This Initiative is unique. Rather than strictly focusing on adding to the existing technology-based learning programs, it approaches the problem of low public interest as a "customer satisfaction" issue. "This approach offends some from the technical community, but our deliberations indicate that the lack of interest in math, science and engineering is a trend that might be reversed if we look at technology-based programs as a product for which we need to provoke demand," Werle said. "Numerous programs compete for the time and attention of our young people and adults. Just as with any other product, we need to promote — even advertise — engaging science-based activities in order to create public demand." That is what the Initiative intends to accomplish.

How it will work

Over the past three years, the Initiative has enjoyed planning level support from the Hoffman foundation of West Hartford, the Connecticut Department of Economic and Community Development and the Pfizer Corporation. It is now pursuing public and private funding for a multi-year trial of the concept. It links like-minded organizations, aggressively promotes existing and new programs and fills in programming gaps in certain target geographic locations, particularly urban areas.

The Initiative calls for the creation and testing of a support system that would operate similarly to the Arts Council of the United States. In the past 30 years, a network of national, state and community-level Arts Councils have effectively made the arts of value and interest to the national public. Information and funds flow through the network to assist community-based organizations, more than 90 of which exist in Connecticut and over 4,000 of which exist nationwide, in promoting the arts to the public.

Many of the pieces appear to be in place to replicate the Arts Council model. "There are federal agencies with vested interest in the topic, national academies for guidance and leadership in expanding the concept nationwide, state-level academies to provide regional grounding and local community-based entities to provide grass roots support," Werle said. "All of these elements will participate in the Initiative, collectively learning how to come together to make progress on the technological literacy issue."

Community involvement

Already, approximately 100 of the state's government, educational, business and community leaders have contributed thousands of hours of effort developing the Initiative's concept and plan.

"Kids today are exposed to technology from an early age — computers, television, video games — and many have a curiosity about how these things work," said Elaine A. Pullen, president of Gerber Scientific Products. Pullen is co-chair of the Initiative's Charter Board of Advisors/Directors and chair of the Connecticut Technology Council. "The Initiative is focused on raising the awareness of the importance of math, science and engineering and on making it easier to find related activities. Parents need help to get their children involved in science fairs and other related activities."

Ted Sergi, president and chief executive officer of the Connecticut Center for Science & Exploration (CTCSE), a \$150 million project slated to be part of Hartford's Adriaen's Landing, is the former state commissioner of education.

"Our state has one of the highest educated populations, but the number of people involved in math, science and engineering in Connecticut is declining," Sergi said. "Many people are quick to

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Science and Engineering Notes from Around Connecticut



Business & Industry

TEACHERS' TURN TO LEARN. Thirty-six Connecticut teachers are working as "externs" at local companies this summer to get hands-on experience about new business technologies. The externship is part of a two-year National Science Foundation program that also includes workshops, conferences and seminars. It is designed to help educators better align classroom learning with the skills needed in today's economy. The program is administered by the **Connecticut Business & Industry Association (CBIA)** in collaboration with the **Connecticut State Community College System**.

BOLD AND STRIKING SCIENCE CENTER. Four architectural firms have been selected as finalists in an international design competition overseen by **Robert A. M. Stern**, dean of architecture at **Yale**, to design what is expected to be a bold and striking science center on the last remaining parcel at **Adriaen's Landing** in Hartford. When completed, the center will offer exhibits exploring the **Connecticut River**, health and medicine, outer space and the relation of science to the state's arts and heritage venues. The 160,000-square-foot building will include a large screen theater, a smaller multi-use theater, an education center with classrooms and teacher resources, a restaurant and a gift shop. It would be the second largest building in New England, ranking behind the Boston Museum of Science. **Cesar Pelli & Associates Architects** of New Haven, Moshe Safdie and Associates Inc. Architects and Planners of Boston, Zaha Hadid Architects of London and Behnisch, Behnisch & Partner Inc. of Venice, Calif., have until Sept. 15 to submit their final proposals. Stern recently designed the much acclaimed **Mark Twain House** on **Farmington Avenue** in West Hartford.

HEALTHY MERGER. **Oxford Health Plan's** stock jumped 8% when news leaked out about its impending merger with Minnesota-based UnitedHealth. By acquiring Oxford Health Plan, UnitedHealth hopes to create the fastest-growing, most powerful health insurer in the Connecticut-New York-New Jersey region. Most of Oxford's 3,100 employees are based in **Trumbull**. Currently, UnitedHealth has 2,083 employees in Connecticut. The company is eager to build its presence in the region, where it serves about 730,000 people. The merger is also expected to give UnitedHealth more negotiating leverage with Connecticut doctors and hospitals.

BILLION DOLLAR DEFENSE PLAN. A newly passed \$401 billion dollar federal defense spending plan for 2005 calls for almost full funding of the programs that are most important to Connecticut defense contractors and their workers. In particular, Stratford-based **Sikorsky Aircraft** would build 55 Black Hawk helicopter variants in the next fiscal year. Twenty-two F/A-22 fighter jets, powered by **Pratt and Whitney** engines, are also part of the plan. Pratt will also be involved in construction of one Virginia-class submarine — a shared program for Groton-based **Electric Boat** and its partner, Newport News Shipbuilding of Virginia. East Hartford-based Pratt and Sikorsky are divisions of **United Technologies Corp.**



Communication

CELL RESCUE. Said **Coventry Police Lt. Walter Solenski**, who responded to **Raymond Blanchette's** 911 call, "If he didn't have a cell phone, I don't know how we would've found him."

Blanchette, 24, who fell asleep at the wheel while driving home from his fiancée's house, landed in a wooded culvert after his truck hit a guardrail and tumbled off Route 44. Although Blanchette wasn't sure where he was, he was able to tell 911 operators that he was near an overpass and probably not visible from the road. During the 45 minutes it took to find him, Blanchette, whose leg was broken in the accident, remained on his cell phone as police retraced the route from his home in Coventry to his fiancée's home in Tolland.

SEVEN YEARS TO SATURN. On July 1, NASA's \$3.3 billion Cassini probe completed a seven-year, 2.2-billion mile voyage, successfully braking into orbit around the ringed planet Saturn. Said **Trinity Professor Mark C. Lewis**, a student of Saturn's rings since the 1990s, "the probe is the size of a school bus and contains a large array of scientific instruments to measure and photograph all aspects of Saturn, its moons and its rings." Within days after the Cassini spacecraft entered Saturn orbit, the probe's results began to show a complex and fascinating planetary system. Lewis, who has a doctorate in Astrophysics and planetary science, thinks Cassini will "teach us things that we didn't even realize we didn't know. The amount of information we get about the outer solar system will be unprecedented."

NIH GRANT FOR AUTISM. The National Institutes of Health (NIH) awarded Communication Disorders Professor **Rhea Paul** of **Southern Connecticut State University** a major mid-career development grant to pursue her research on autism. During the next five years, Paul will take a break from teaching to study "prosody" in high-functioning autistic children, from age 8 to 18, at the **Yale Child Study Center** in New Haven. Prosody refers to the communication characteristics that accompany speech, such as rhythm, pauses, stress and intonation. Individuals with autism often have trouble with prosody: they speak in a mechanical manner and fail to recognize prosody in others. Paul will try to determine why this happens and, collaborating with MIT robotics engineers, how to create a toy-like robot that trains people to use prosody.

WI-FI ON MAIN. **Middletown** recently installed free wireless Internet access throughout most of the downtown area. "Look at how strong the signal is," said **Ganaesan Ravishanker**, director of **Wesleyan University's** technology services and a key part of the city's wireless fidelity (wi-fi) effort. Sitting outside the **First & Last Tavern**, Ravishanker was reading email from his laptop, which he had perched on a café table next to his lunch. Said Middletown Mayor **Domenique Thornton**, "We want Main Street to be a place for college students, writers and business people of all kinds. Wi-fi technology adds to the vitality of the street."



Education & Cognition

"BEST PRACTICES" WEBSITE. This summer, the **Connecticut Business & Industry Association (CBIA)** introduced a new website specifically designed for state teachers. The site, called proedresources.com, offers teachers well-documented best prac-

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 179 Allyn St., Suite 512, Hartford, CT 06103-1422, or email us at acad@ctcase.org

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tices in math, science and language arts and is funded by the **Connecticut Department of Education**.

NO ID UNDER STRESS. Contrary to what you might think, most of us would be unable to recognize or ID people we encounter in highly intense and stressful situations. This conclusion was the result of a study conducted by researcher **Charles Morgan**, associate professor of psychiatry at the **Yale School of Medicine**, on 500 military personnel enrolled in survival training. In the study, the soldiers were sleep deprived and then interrogated under stressful conditions, which included physical confrontation. Afterwards many were unable to describe the interrogator or even identify his or her gender.

BREATHING LIFE INTO ENGINEERING. "I don't want to just create engineers," said **Nelly Abboud**, director of the undergraduate engineering program at the **University of Connecticut**. "I want to create engineers who are successful and contribute to the community." Abboud, a native of Lebanon, likes to introduce young people, especially women, to the world of engineering by showing how it touches all aspects of life and by making it fun. She uses humor and a hands-on approach. Says Abboud, "I don't throw out theory, I give them a problem and show the variables that lead to solutions x, y or z." She and her students study issues that apply to everyday life, health and well-being, such as how to best recycle water in a wastewater treatment plant.

SCIENCE TEACHER'S DREAM. Nearly a decade of dreaming and three years of fundraising have resulted in the **Salmon Brook Ecology Center in Granby**, the brainchild of middle school science teacher **Bruce Boehm**. The center contains tanks where trout will be raised for release into local streams and a nursery for growing plants in water. It incorporates environmentally friendly systems like geothermal heat and state-of-the-art solar cells to convert sunlight into electricity. "It was an idea that fueled the energy and passion of an entire community," said **Trish Percival**, chairwoman of the **Granby Education Foundation**, which helped to raise the \$350,000 needed for the project.

PROJECT ABC. Two seniors at **Connecticut College**, **Alexandria Gomes** and **Tiana Davis**, used what they learned growing up in loving but often struggling single parent homes, to create an after-school program for kids. In the program, Connecticut College students volunteer as mentors to 15 sixth graders at the **Bennie Dover Jackson School in New London** and also on their college campus. The program, which has won numerous public service awards, was created to help reduce school dropout rates and get kids excited about higher education and attending college. It provides a safe haven for kids after school that addresses both their personal and educational needs.

UPSKILL WORKFORCE. Although Connecticut is a state where the workforce is better educated and more productive than the national average, being among the best in America is no longer good enough in a competitive global economy. Notes **Roger Joyce**, vice president of the **Bilco Company**, a manufacturer of architectural products in West Hartford, "We sell in 65 countries. Our workforce must be at least as skilled as our competitors' in other countries." That's why the **Connecticut Business & Industry Association (CBIA) Education Foundation**, once solely focused on helping students build skills, has broadened its reach. It is now helping employers "upskill" their workforce to keep pace with technology and global competition. The foundation helps companies identify training needs, secure grant funding for training and locate joint training opportunities with companies that have similar training needs.



Energy

POWER GRID HOLDING. "Our forecast looks like we'll be able to maintain reliability and keep the lights on for the rest of the summer," said **Stephen G. Whitley**, chief operating officer of **ISO New England**, the region's power grid operator. He added that power supplies could be in short supply in the usual problem spots like southwestern Connecticut and Greater Boston if transmission lines can't bring in enough power at peak times. If that happens, he explained, the grid operator may have to ask people to cut back on electricity consumption. In southwestern Connecticut, ISO New England has started new energy conservation programs to see the region through summer heat waves until a major new transmission line is complete.

CITIES, TOWNS MANAGE FUEL COSTS. Local town and city officials, concerned about rising gas prices and the impact on their ability to run police cruisers, snowplows and the rest of their motor pool, are using collective purchasing and other strategies to manage fuel costs. This year, many Connecticut towns are paying about 22% more than last year. Some towns, like **Bolton** and **Manchester**, will choose to lock in a price with suppliers when they bid motor fuel contracts through the **Capitol Region Council of Governments**. Other towns, like **Enfield**, **East Hampton** and **Portland**, are keeping their fleets tuned and are looking at purchasing more fuel-efficient vehicles and hybrids in the future.

SOLAR POWER TO GO. The Rolling Sunlight, a Greenpeace-owned truck attached to 256 square feet of solar panels, helped to supply some of the power for end-of-year festivities at **Wesleyan** this year. At the request of students, the solar truck, which was beginning a 20-campus tour of the Northeast, showed up at Wesleyan to promote the cause of bringing cleaner energy to the university. **Marcia Bromberg**, Wesleyan's vice president for finance and administration, said officials are already looking at a number of ways to make their campus more environmentally friendly.



Environment

BLACK BEAR RELO. A 225-pound male black bear spotted near **Waterbury Hospital** was tranquilized by the **Department of Environmental Protection's (DEP's) Immobilization Team** and relocated to a nearby state forest. Said **Dale May**, Director of DEP's Division of Wildlife, "An established bear population is now part of Connecticut's landscape." Day explained that DEP does not remove nuisance bears unless they venture into areas where it's unlikely they will find their way back to the woods. As a precaution, homeowners should remove bird feeders in the spring; store garbage indoors; wash garbage cans to reduce odors; clean barbecue grills; and protect livestock and berry bushes with electric fencing.

TIS THE SEASON. A new permanent exhibit has opened at the **New Britain Youth Museum at Hungerford Park** that explores how the region and its inhabitants — people, plants and animals — have adapted over the years to changes of season as well as to changes of environment from farm to suburbs. Snowstorms, floods, farms, orchards, ice harvesting, maple sugaring and other influencers are recurring themes. The paintings of **Nelson Augustus Moore**, who lived and painted in **Kensington** in the late 1800s, help to tell the story. Said **Museum Director Ann Peabody**, "We want people to understand about daily life centu-

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ries ago, how difficult it was to keep warm, cook food and heat water for laundry.”



Food & Agriculture

CAUGHT IN FLIGHT. Most people think that hummingbirds live entirely on nectar from flowers siphoned through their needlelike beaks. But actually, hummingbirds supplement their liquid diet with insects nabbed in midair during flight. According to researchers at the **University of Connecticut** (who captured the process on videotape), they can do this because their lower jaws flex downward while simultaneously bowing sideways, enlarging the opening and allowing flies to enter the mouth.

CAMPUS GREEN. “Every year, we will develop new ideas and action plans to make this a greener campus,” says **Richard Miller**, **University of Connecticut’s** environmental director. The school’s enhanced environmental policy will set guidelines for new construction and renovations, conserve energy and water, and further encourage recycling. The short list includes: reducing greenhouse gas emissions by installing “sleeper” software that automatically shuts down approximately 10,000 computers left on at night, saving \$500,000 dollars annually; selling environmentally friendly coffee mugs; and a campaign encouraging students to place discarded electronic equipment into separate bins when they leave for the summer.

A-MAIZING MAZE. “We want people to enjoy agriculture in an innovative and creative way,” said **John Lyman**, Executive Vice President of **Lyman Orchards in Middletown**, speaking about the orchard’s fifth annual four-acre corn maze event. Open throughout September and October, the event has drawn over 80,000 visitors in the past. This year’s design, chosen by Lyman Orchards employees and crafted by MAIZE company founder Brett Herbst, is the most challenging one so far. It’s a replica of the acclaimed Lyman Orchards’ golf course. Once the maze is cut and the corn reaches the right height, visitors are given navigation tools and must find their way through it. Part of the proceeds from ticket sales for the maze are donated to the American Cancer Society.

DON’T SELL THE FARM. According to **Ellington** first selectman **Dennis Milanovich**, Connecticut has had a development pattern for many years in which grazing cows and cultivated fields have been replaced by expensive homes and shopping centers. “We need to change these policies,” said Milanovich. He suggests that farms be viewed for what they are: suppliers of jobs and producers of healthy products. They are low maintenance, require very little infrastructure, make a positive contribution to the tax base, and will not move overseas. By bringing venture capital to local farms, he counsels, those farms can continue feeding the state’s residents for years to come.

CLONE OF CLONE. Four years after the fact, scientists at the **University of Connecticut’s Center for Regenerative Biology** and their Japanese associates have confirmed two live births of second generation clones from a famous Japanese breeding bull. One died soon after being born, but the other, called Kamitakafuku (God of High Happiness), is alive and well. The delay in reporting was to make sure the bull (cloned from the ear skin cells of a cloned bull) developed normally and was fertile. In Japan, scientists hope cloning technology will improve the quality and speed of beef cattle breeding.

ANIMAL FARM. On **Woodbridge Farm in Salem**, farm manager **Steven Bibula** uses the “biodynamics” principles of Austrian Rudolph Steiner, who conceived them in 1924, to raise livestock for the **Bingham** family. Bibula has tripled his herd of cows and kept up his grass even with less rain. He does so by treating the farmland and its animal inhabitants as one entity that, properly coordinated, will sustain itself. Some of the most important elements of this technique include moving the chickens into the field to pick apart the manure after the cows have been there, getting the compost into the field when it’s the most potent, and rotating grazing so it serves the needs of the pasture first and foremost.

TICK TICK TICK... In the basement of the not-yet completed **Johnson-Horsfall** building at **The Connecticut Agricultural Experiment Station in New Haven**, a trio of experts led by tick expert **Bonnie Hamid** work to determine if the tick that just bit you was infected with Lyme Disease. Last year, the lab tested 5,667 deer ticks; of those 1,735 were infected. The tick team shares the lab with a group studying the West Nile virus. Although Lyme Disease has been known in Europe since the 1800s, it was first recognized in the United States in 1976 in Lyme Connecticut. If diagnosed early, it can be treated with antibiotics.



Health

CATERPILLAR CELLS FIGHT FLU. A local **Meriden** company, **Protein Sciences**, may have a vaccine that can protect more elderly people from influenza than existing vaccines. Currently, all flu vaccines are made from chicken eggs and require an eight-month lead time for production. Because the new vaccine uses caterpillar cells instead of eggs, it can be produced fast enough to protect people against rapidly emerging strains of flu. In two trials to date, the new vaccine has shown no major safety problems. **Daniel Adams**, president and chief executive of Protein Sciences, says Phase 3 trials will start in the fall and will be evaluated by spring 2005. If all goes well, the vaccine should be on the market by the following flu season.

NON-SURGICAL STERILIZATION. Two new non-surgical procedures for women, one on the market and the other still being tested, are so simple and painless, they may soon become the sterilization process of choice. In traditional tubal ligation, doctors make one to three small incisions in the abdomen while the patient is under general anesthesia. With the new procedures, there are no incisions and only local anesthesia is used. Doctors guide a thin scope through the cervix into the uterus, where they insert a plug at the entrance to the fallopian tube. At **Hartford Hospital**, **August C. Olivar** uses a stainless steel coil plug approved in late 2002. At **New Britain General Hospital**, **Anthony Luciano** is testing a newer plastic plug that is smaller than half a grain of rice. In both cases, scar tissue eventually grows around the plug, sealing the opening and providing permanent birth control.

CENTERING PREGNANCY. “I’m talking about nutrition eight times in a row, everyone has the same complaint, the same question and I never have all the answers,” said **Sharon Rising**, a **Yale-trained** Cheshire nurse-midwife, speaking about pre-natal care the old-fashioned way. In a group, she said, “everyone can share ideas and make suggestions.” Rising’s brand of group pre-natal care is called Centering Pregnancy. Said **Heather Reynolds**, a nurse-midwife at the **Women’s Center at Yale-New Haven Hospital**, “Pre-natal patients in groups keep better track of their weight, their blood pressure and the growth of their bellies.” So

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far, group pre-natal care has been offered primarily in clinics. Proponents hope that will change at the end of a large research project now underway in New Haven and Atlanta. Results of the federally funded study, which compares birth outcomes for over 1,000 women, half in Centering pregnancy groups and half in traditional one-on-one care, are due in about two years.

SPECIAL FAMILIES COMMUNITY. "It's overwhelming for a lot of people," said **Victoria Niman**, medical director for the state's **Department of Children and Family (DCF)**, who oversees the foster care placement of children termed "medically complex." But there may be a solution in the wings. Currently, hundreds of Connecticut parents of profoundly disabled children find the isolation and strain of providing round-the-clock care for their kids at home overwhelming. Due to a severe nursing shortage in Connecticut, home health care agencies do not have enough nurses to go around. Distraught parents are forced to take their children to the **Hospital for Special Care** in New Britain or put them into DCF custody. Now there's an ambitious alternative being proposed — a first of its kind, communal community. The project, which would require \$3 million in state funding, would provide eight homes that share nursing, medical and daycare services, as well as the hope and support that comes from common experience. The cost of care in these homes would be \$100,000 less per child than in specialized hospital care.

OF MICE AND SPICE. According to a recent **Yale University** research report published in the current issue of the journal *Science*, the spice turmeric has shown promise in combating cystic fibrosis (CF) in mice. CF is a genetic disease that attacks the airways and lungs, as well as the organs involved in the digestive process. It causes thicker-than-normal mucus that can lead to blockage in the respiratory and digestive systems, often causing death. Researchers found that in cultured cells as well as cells in mice with CF, curcumin, the compound that makes turmeric bright yellow, reversed the damage produced by a mutated gene that causes the most common form of CF.



High Technology

KID-POWERED ROCKET. As their Flamethrower 5000 rocket took off and crossed the basketball court with air and water streaming out the back, 41 kids at **Noah Wallace's** before-school "Build Your Imagination" program in **Farmington** happily chanted, "Do it again, do it again!" **Tom Kowalczyk**, an engineer and project manager at **The Stanley Works**, started the popular program five years ago as a way to celebrate engineering week each spring and to give his own kids (and their classmates) a taste of what engineers do. Said Kowalczyk, "the water-powered land rocket followed a basic product development process." Over 11 weeks, the kids brainstormed a series of ideas, then refined those ideas, then produced a product made of a 4-foot long piece of PVC pipe mounted on the chassis of an old baby jogger, and then with adult help, tested it to see if it works. It did.

BLACK HOLES FOUND. Images from NASA's new Spitzer Space Telescope have allowed researchers to finally detect the missing "black holes" that energized the cores of the earliest active galaxies. The project combined the power of NASA's three Great Observatories in space — the Spitzer Space Telescope (SST), the Hubble Space Telescope (HST), and the Chandra X-ray Observatory — to give images that were not possible with data from one observatory alone. With this combined data, a team led by **Meg Urry**, director of the **Yale University Center for**

Astronomy & Astrophysics was able to take a census of the black holes formed 2-5 billion years after the big bang. Previous observations suggested that most of these young black holes, shrouded in dust, did exist, but few had been found.

USS JIMMY CARTER. Former President Jimmy Carter and his wife Rosalynn were on hand at **Electric Boat** in **Groton** to christen the USS Jimmy Carter, a nuclear-powered Seawolf submarine that is the most advanced of its class. The ceremony took place alongside and on top of the partially submerged vessel. Carter, who was a 1946 graduate of the US Naval Academy, spent several years as a submariner. The 157-member crew, who stood at attention throughout the ceremony, will spend the next year testing and preparing the \$3.275 billion sub for active duty. The Jimmy Carter is unique because of its multi-mission platform and advanced technology that allows it to test a new level of weapons, sensors and undersea vehicles.

HI-TECH BLOOD BOOSTERS. Blood donors, already scarce, get scarcer in the summer because many potential donors go on vacation. While this trend is unlikely to change, some new technologies can help boost blood supplies. In **Farmington**, the American Red Cross recently began using Mobile Collection System (MCS) machines that allow a donor to give two units of red blood cells from one donation. Red blood cells make up about half of hospital transfusions. Another device, called Trima, allows up to five blood components to be collected from one donor.



Transportation

LONGER SOLUTION. When part of **Interstate 95** in **Bridgeport** was damaged by fire during a tanker truck accident, the state **Department of Transportation** had a quick fix in what seemed like no time at all. Now, a permanent solution to completely rebuild the **Howard Avenue Bridge** at a cost of close to \$2 million is bound to take a lot more time. "The reason we were able to accomplish what we did before was because the highway was shut down through that area," said **Arthur Gruhn**, chief engineer for the department. This time the contractors will be constructing the bridge while 150,000 vehicles per day are passing through.

BIKE TO WORK. **Peter Aarrestad**, 47, of **East Hampton** (with a 25 mile commute) and **Glen Sampson**, 57, of **Windsor** (who travels 28 miles) may be two of the most dedicated bicycle commuters in the state, but they're hardly the only ones. In the **Hartford** area alone, there are an estimated 900 people who bike to work. Aarrestad began with lunch hour rides with coworkers. Sampson started biking for fun when he visited San Diego. As a cyclist, Sampson lost 40 pounds and lowered his blood pressure and cholesterol. Both say the ride helps them focus better on the job. And bike commuting helps the environment, too. Last year, Hartford-area bike commuters saved approximately 24,000 gallons of gasoline and 240,000 tons of carbon dioxide.

TUNNEL VISION. "We are very excited that it's actually going to happen," said state representative **Mary Mushinsky, D-Wallingford**, co-chairwoman of the **Quinnipiac River Linear Trail Advisory Committee**. The "it" she's referring to is a soon-to-be-installed \$1.5 million tunnel under the **Wilbur Cross Parkway** that connects the Linear trail to Meriden. Mushinsky and Thompson said the project has taken a long time to organize because this is the first time the state **Department of Transportation** has allowed a tunnel to be built under an active road.

Compiled and edited by Barbara Standke

From the National Academies (from page 1)

modification, should be examined to determine if the inserted genes produce toxins or allergens.

The report offers a framework to guide federal agencies in safety assessment. A new genetically modified food whose composition is very similar to a commonly used conventional version may warrant little or no additional safety evaluation, but if an unknown substance has been detected in a food, a more detailed analysis should be conducted to determine whether an allergen or toxin may be present. In some cases, the committee noted, evaluation should continue after products are on the market — especially for foods with new substances or unusual nutrient profiles — to assess and validate how well pre-market evaluations are working. The committee also urged development of better epidemiological and survey tools that can detect changes in the population's health that may be caused by these foods.

The committee was also asked to examine safety issues related to foods from cloned animals. Here, too, safety evaluation of foods from these animals should focus on the product itself rather than the process used to create it, said the committee, which recommended that the evaluations compare foods from cloned animals with those from non-cloned animals. At present, there is no evidence that foods from cloned animals pose an increased risk to consumers. However, the committee recommended that cloned animals engineered to produce pharmaceuticals be kept from entering the food chain.

[<http://books.nap.edu/catalog/10977.html>]

◆ Food Pyramid Scheduled for Overhaul

The Department of Agriculture (USDA) has announced a revision of the Food Guide Pyramid, originally designed 12 years ago to provide Americans with guidelines for healthy eating. The current Food Guide Pyramid would be renamed the Food Guidance System under the proposed revision. The revision parallels the revision of the Dietary Guidelines for Americans that is currently underway; the revised Guidelines are scheduled to be released early in 2005.

Development of the new Food Guidance System has been conducted in phases. In the first phase, USDA gathered information through technical research, professional and public input, and consumer research in order to update the guidance system's daily food intake patterns to meet the latest nutritional standards. The next and final phase includes developing an updated graphic image and educational materials that communicate in ways that consumers can more easily understand.

The USDA is seeking public comments on the graphic image along with the motivational and educational messages for a new Food Guidance System. They have identified six particular areas of interest for public input and comments, including the configuration of the new graphic, strategies to improve awareness and motivation for using the information, methods to assist consumers in personalizing the system, strategies to improve educational messages, interactive tools to demonstrate the messages and communication delivery channels for the message.

[<http://www.cnpp.usda.gov/pyramid-update/>]

◆ Report Examines Energy Pipeline Safety

A new report from the National Academies' Transportation Research Board (TRB) examines safety issues related to energy transmission pipelines, which transport virtually all of the nation's natural gas and two-thirds of its petroleum each year. The report recommends that the federal government develop guidelines for land-use decisions to minimize risks to the public, pipeline workers and the environment near existing and future pipelines.

At the request of the Office of Pipeline Safety (OPS) in the US Department of Transportation, the TRB committee was asked to consider the feasibility of developing risk-informed guidance that could be used in making land use-related decisions as one means of minimizing or mitigating hazards and risks to the public, pipeline workers, and the environment near existing and future hazardous liquids and natural gas transmission pipelines. In addition, the panel was asked to consider environmental resource conservation issues in pipeline rights-of-way. The panel concludes that judicious land use decisions can reduce the risks associated with pipelines by reducing the probabilities and consequences of incidents; that it is feasible to use a risk-informed approach to establish land use guidance for local governments; that the federal government could plan a useful role by providing leadership in the development of such land use guidance; and finally, that there is clear evidence that guidelines can be developed that would assist in preserving natural habitat while maintaining rights-of-way.

The panel recommends that the OPS "develop risk-informed land use guidance for application by stakeholders," and that the process for developing such risk-informed land use guidance involve "the collaboration of a full range of public and private stakeholders ... ; be conducted by persons with expertise in risk analysis, risk communication, land use management, and development regulation; be transparent, independent, and peer reviewed, and; incorporate learning and feedback to refine the guidance over time."

[<http://books.nap.edu/catalog/11046.html>]

◆ NASA Should Commit to Hubble Servicing Mission

In an interim "letter report" from the National Research Council's Committee on the Assessment of Options for Extending the Life of the Hubble Space Telescope, the committee urges the National Aeronautics and Space Administration (NASA) to commit to a servicing mission for the Hubble Space Telescope (HST). The report also notes that a proposed robotic mission would be quite complex and require significant development, and urges that NASA not make any decisions that preclude future space shuttle missions to the telescope until the agency more thoroughly examines the engineering and technology requirements of both robotic and human repair missions. The interim report was issued in response to NASA's sense of "some urgency" with respect to recommendations relating to HST; a final report will be released early this fall.

The board finds that "compelling scientific returns" will result from a servicing mission that accomplishes the scientific objectives of the originally planned NASA mission SM-4. These include the addition of two new instruments — a Wide Field Camera-3, or WFC3, and the Cosmic Origins Spectrograph, or COS — as well as gyroscope and battery replacements. The committee also finds that the proposed robotic servicing mission "involves a level of complexity, sophistication, and technology maturity that requires significant development, integration, and demonstration to reach flight readiness." As a result, they recommend that NASA begin immediately to take an active partnership role that includes HST-related demonstrations in the robotics space experiments that are now underway in other agencies.

Following the loss of the Space Shuttle Columbia and subsequent to the report of the board created to investigate the accident, NASA, citing safety reasons, decided to limit shuttle flights to International Space Station missions and to investigate other options for extending Hubble's life. Congressional concern over this decision prompted it to ask for an independent assessment. In response, the chair of the investigative board called for a study of the risks and benefits of using the shuttle for the servicing mission, and NASA subsequently asked the National Research Council for this study.

[<http://www.nap.edu/catalog/11051.html>]

Initiative (continued from page 2)

place the blame for this on teachers or parents or another group. The fact is that it is the fault of the entire community. The most important aspect of the Initiative is that it brings together the entire community — employees, schools, kids, parents and community groups. Its major selling point is that it has the potential to get into people's homes and affect younger children. We need to get parents to the point where they are encouraging their children to pursue careers in science and technology. This community base is a very important part of the solution."

According to Sergi, the CTCSE is planning to be a major partner with the Initiative. "There is a great deal of statewide interest in the Initiative, which will help ensure its future success," he said.

Progress to date

The Initiative has generated increasing interest in the past several years. "In the beginning, people in the technical community thought we were a bit crazy to propose approaching technological literacy using a model based on the arts," Werle said. "Over time, people at the state and federal level, particularly those experienced with arts organizations, began to embrace the concept. Now we are experiencing a very high level of receptivity among community and thought leaders. Our contacts at the Federal level also are becoming intrigued. In the past year, we have begun to get high-level traction on this project.

"The beauty of our approach is that it is radically different and yet so simple. It gives ownership at the local level. Every community group approached has embraced the idea because they are going to own the programs."

In 2004, the Initiative rolled out pilot extracurricular programs at the middle school level in Waterbury and Stamford that were supported by the Connecticut Career Choices program of the Governor's Office for Workforce Competitiveness. Additionally,

assistance was provided to the Westinghouse Science Corporation in developing and overseeing a program to provide science and technology speakers for middle schools in Windsor and South Windsor. In both cases, science and technology professionals interacted with youths to stimulate, motivate and/or coach. These programs were very well received and will be expanded to other communities in the coming year.

After receiving funding, the Initiative's next steps will include working with three to four organizations to test the system and simultaneously instituting the Connecticut Science & Technology Collaborative, the state-level oversight committee. A franchising-type approach will be used to spread the system statewide. Like the Arts Councils, the Initiative could reach hundreds of thousands in the state through councils, publicity, mini-grants, a speaker's bureau, mentors, public forums and presentations.

"Our hope is that it may one day be used as model for a larger, national effort," Werle says.

The Initiative's long-term success would ultimately strengthen the pool of resources for science and engineering companies. "If Connecticut's technology environment becomes more vibrant, it will help companies in our state," Pullen said. "The long-term ideal would be to build a cluster environment where other companies could work and we could learn from each other and trade resources and ideas. I'm particularly interested in the role that the Initiative will take in creating a culture that recognizes the role of science and technology in the economic development of our state."

Sergi agrees, saying that "the social and economic health of the state and the country are highly dependent on our preparedness and that is directly linked to math, science and technology. No matter what issue you look at ... the environment, health care ... the solutions are based in science. This is bigger than a workforce issue — it really is about the quality of life." — **Karen Cohen**

[Karen Cohen owns and operates The Write Stuff, Hebron, CT]

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