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Preparing for Pandemics: Ebola Tests State's Policies and Protocols

Amidst news of the end of Ebola in Liberia during May 2015, a patient was admitted on May 12, 2015, to UConn Health's John Dempsey Hospital to rule out this potentially life-threatening disease. He had worked in an Ebola Treatment Unit in Liberia before the country was declared "Ebola free," and was within the known incubation period for this infection. The patient was eventually determined to be Ebola free—his symptoms were due to a malarial infection.

The patient's hospital admission set in motion a protocol devised by UConn Health that was carried out in conjunction with other Connecticut Department of Public Health (DPH) efforts that have been perfected since they were first developed in October 2014. The DPH monitors returning travelers at risk for Ebola Virus Disease and also has plans to deal with other potential infectious hazards that could impact the state. Connecticut's Ebola response is not the first time the state has created a response plan to a potentially serious contagious disease.

Connecticut issued an organized response to a possible influenza pandemic in October 1997 when the DPH received a grant of \$12,310 from the Council of State and Territorial Epidemiologists (CSTE) and the Centers for Disease Control and Prevention (CDC) to pilot the first iteration of the federal pandemic influenza planning guide for state and local health officials. In February 2006, the DPH issued a Pandemic Influenza Response Plan. The plan outlined descriptions of the roles and responsibilities of the DPH in an influenza pandemic, including instructions for local and regional public health and health care providers. The 2006 plan lists policies that hospital and health care workers are required to follow including:

- Establish emergency operations centers and collaborate with DPH to monitor the pandemic
- Provide information in response to patient inquiry on symptoms of influenza
- Isolate patients and enforce quarantines of employees and patients as needed
- Vaccinate employees and patients and/or provide antiviral agents to health care providers and patients in accordance with DPH recommendations
- Conduct and enforce other activities as may be declared necessary by the governor and the commissioner of public health.

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From the National Academies

The following is excerpted from press releases and other news reports from the National Academies of Sciences, Engineering and Medicine (www.national-academies.org).

◆ Flood Insurance: Linking Rates to Risk

The National Flood Insurance Program (NFIP) was created in 1968 to reduce the flood risk to individuals and their reliance on federal disaster relief by making federal flood insurance available to residents and businesses if their community adopted floodplain management ordinances and minimum standards for new construction in flood prone areas. Roughly 1 million flood insurance policies—one-fifth of NFIP's 5.5 million policies—receive subsidized rates because the insured properties existed before floodplain maps became available. Most of these structures are negatively elevated, that is, the elevation of the lowest floor is lower than the NFIP construction standard. Compared to structures built above the base flood elevation, negatively elevated structures are more likely to incur a loss because they are inundated more frequently, and the depths and durations of inundation are greater. Under the Biggert-Waters

(See NAS, page 7)

Submarine Force Museum Preserves, Interprets Submarine History

The Submarine Force Museum's mission is to collect, preserve and interpret the history of the US Submarine Force to honor veterans and educate the public in its heritage and traditions. One of the ways the museum does this is by developing and presenting programs that broaden and deepen public knowledge and appreciation of the significance of the Submarine Force.

These programs vary from guided tours of the museum's exhibits—including the Historic Ship Nautilus—that highlight the technological development of submarines and the accomplishments of the Submarine Force, to classroom-based presentations and activities dealing with the science of how submarines work.

Most Fridays throughout the summer, the museum, located on the Thames River near Groton, holds public demonstrations of Science, Technology, Engineering and Mathematics (STEM)

(See Submarines, page 8)



Museum Education Specialist Eury Cantillo and a group of sailors visit Ella T. Grasso Technical High School in Groton to build robot "Seaperch" submarines. [Photo: Submarine Force Museum]

In the fall of 2014, Ebola left the shores of West Africa and began to sicken American citizens. States hastily implemented programs, sometimes without sufficient resources or a complete understanding of best practices, to meet this virulent disease. Because of Connecticut's 2006 Pandemic Influenza Response Plan, the state was better equipped than others to form a response to the Ebola crisis.

On October 7, 2014 Governor Malloy declared a public health emergency and signed an order giving DPH Commissioner Jewel Mullen the ability to quarantine an individual or group who may have been exposed to or infected with Ebola. According to state officials, without this declaration, there would have been no statewide ability to isolate or quarantine, but rather the authority would have been left up to individual local public health district directors. Nine days later, the governor implemented quarantine and isolation protocols in New Haven, additionally directing every hospital within a week to perform a drill to assure that procedures and Emergency Medical Services (EMS) were up to standard. Although a Yale student in New Haven did not have a confirmed case of Ebola, Governor Malloy was acting preemptively to prevent any potential health crises from occurring. The American public was concerned, after witnessing the death of Thomas Eric Duncan on October 8 following medical missteps beginning September 26 with his release from Texas Health Presbyterian Hospital, that Ebola was a threat requiring attention and resources if it was to be contained.

By Tuesday, October 14, 2014, all twenty-nine acute care hospitals in Connecticut reported their readiness to act if a patient potentially

infected with Ebola virus came through their doors. After an initial review of the hospitals' readiness checklist, Commissioner Mullen noted, "everyone is engaged in planning and preparation." All hospitals were told to ask incoming patients if they had traveled to West Africa in the past 21 days and to inquire about any pertinent symptoms. Although specific hospitals were not designated as Ebola treatment centers, the Connecticut Hospital Association (CHA) issued this statement on October 16: "CHA and hospitals began regular emergency preparedness coordination calls last week to share tools and resources, as well as best practices and lessons learned, particularly from hospital drills. As long as Ebola is a threat, we will continue to monitor the situation and share information to keep everyone in Connecticut safe."

On October 26, 2014, Malloy went a step further and stated that "travelers arriving in Connecticut from the three West African countries impacted by the Ebola virus, Guinea, Liberia and Sierra Leone... will be subject to 21 days of active mandatory monitoring, and Connecticut's DPH will review each case and determine if additional steps beyond monitoring are necessary based upon a review of the person's travel history and potential exposure." Those travelers were also expected to take their temperature twice daily and public health workers would be in contact, by phone, twice daily. Some of these stipulations were delivered with more clarity than the initial CDC guidelines. The CDC recommended individuals with symptoms call their doctors and seek medical treatment, but Connecticut's policy required that individuals with symptoms go to a hospital and be evaluated with proper protections in place. Additionally, the governor created a Unified Command Team (UCT) going "above and beyond what the Centers for Disease Control (CDC) is recommending." The UCT is chaired by Jewel Mullen and was created to serve in the state's ongoing emergency management efforts. On October 24, 2014, the UCT published Guidance for First Responders that restates the universal precautions used whenever faced with exposure to infectious diseases with further specific measures that should be taken when possibly exposed to Ebola.

Although there has not been a confirmed case of Ebola in Connecticut since the policies were enacted, eight people were restricted to their homes with monitoring during the 21-day incubation period for Ebola virus disease. Connecticut's actions were among the most measured and targeted of those by states potentially impacted by the disease. And while Connecticut took these measures, some policy makers suggested Connecticut could have gone a step further in issuing a travel ban for individuals returning from affected West African nations. Others saw that measure as unnecessary and counterproductive, as it may have inhibited people from reporting symptoms.

In addition, Melissa Marquis, Public Health Emergency Response Specialist for the West Hartford-Bloomfield and Farmington Valley Health Districts in Connecticut, used Connecticut's protocols as a model to develop a tool to assist national health departments in identifying gaps, determining priorities, and developing plans useful for Ebola, but also applicable to other health crises. According to Marquis, "The intent behind the creation of this tool is to be able to show documentation of all activities taken, and to serve as a resource for completion of multiple local, state, and federal deliverables across the public health spectrum." Marquis notes this tool could be helpful for local health departments as they evaluate and monitor, identify lessons learned, and develop action plans for various situations similar to the one created by Ebola.

We live in a time when diseases that strike people on one continent impact those of us on another. The best way to minimize that impact is to create and implement detailed and coordinated plans to anticipate all possibilities. Based on the response to the Ebola threat in 2014, Connecticut has developed such a plan that effectively prepares the state to confront Ebola or any other potential infectious disease threat. — **Wendy Swift, freelance writer.**

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Science and Engineering Notes from Around Connecticut



Biomedical Research

EVOLUTIONARY ‘HOUSE OF CARDS.’ In May, **Yale** researchers **Andrea Hodgins-Davis** and **Daniel P. Rice** published a study in the journal *Molecular Biology and Evolution* suggesting the “house of cards” model holds true for evolution, demonstrating that “mutations with large effects effectively reshuffle the genomic deck.” This contrasts with previous models that suggest species evolve from the accumulation of many mutations, each with a small effect. “We found this model applied across vast evolutionary time—in yeast, worms and flies,” said **Jeffrey Townsend**, associate professor of biostatistics and ecology & evolutionary biology and senior author of the study. New technologies make it possible for researchers to gather data and analyze the impact of genetic mutations on evolution, supporting the theory that mutations do not cause small changes in fitness, but trigger a cascade of changes—an evolutionary “house of cards.”

CBIT TO LEAD SEED GRANT PROGRAM. In June, **Connecticut Innovations (CI)** announced that the **Yale Center for Biomedical and Interventional Technology (CBIT)** will lead a new \$1 million seed grant program. Funds for the program were awarded through CI’s **Connecticut BioScience Innovation Fund**. The program’s purpose is to support the development of biomedical devices, diagnostic technology, health information technology, or digital health services proposed by students, faculty, and start-ups associated with Connecticut universities. A committee of experts from **Yale, UConn, and Quinnipiac** will review applications. “This critical gap funding will advance the best biomedical ideas across the state to the stage where they can thrive within companies,” said **Chris Loose**, executive director of CBIT and the principal investigator for the grant.



Business & Industry

UTC TO SELL SIKORSKY AIRCRAFT TO LOCKHEED MARTIN. On July 20, **Lockheed Martin** announced it would purchase **United Technologies Corp.’s (UTC)** subsidiary **Sikorsky Aircraft** for \$9 billion in cash. With 8,050 employees, Stratford-based Sikorsky is Fairfield County’s largest employer. Lockheed Martin expects to complete the purchase by early 2016, pending regulatory approval. “We are very pleased to announce this transaction,” said UTC president and CEO **Gregory Hayes**. “Exiting the helicopter business will allow UTC to better focus on providing high-technology systems and services to the aerospace and building industries and to deliver improved and sustained value to our customers and shareowners. **Marillyn Hewson**, CEO of Lockheed Martin, noted, “Sikorsky is a natural fit for Lockheed Martin and complements our broad portfolio of world-class aerospace and defense products and technologies.”

CALIFORNIA GROUP TO PURCHASE WATERBURY HOSPITAL. Under an agreement announced in May, **Waterbury Hospital** will be sold to Los Angeles’ **Prospect Medical Holdings** after a deal with Texas-based **Tenet Healthcare** fell through in December 2014. Since 2012, the hospital, with 2,000 employees and a budget of \$270 million, has been exploring potential financial partners and buyers. The arrangement could take between six and 12 months to complete.

AETNA TO ACQUIRE HUMANA FOR \$37B. Hartford-based **Aetna** announced it will spend \$37 billion to buy **Humana Inc.**, making Aetna the nation’s second-largest insurer and a sizeable player in the rapidly growing Medicare Advantage business. The purchase includes a combination of cash and stock.

STATE ADDS \$10M FOR BROWNFIELD REMEDIATION.

Connecticut will contribute an additional \$10 million towards brownfield remediation and development, allowing for more projects to be addressed on Connecticut’s inventory of 281 properties that require extensive remediation before development. The largest site is the former **Norwich State Hospital** with 470 acres. **Tim Sullivan**, deputy commissioner of the **Connecticut Department of Economic and Community Development**, remarked that every dollar spent on brownfields over the past four-plus years was matched by close to \$4 in outside investments. Past projects include the **Norwich Hospital** site, the **Pawcatuck Threadmill** project and the **Cohanzie School** remediation in Waterford. Funding is also in place for the 8-acre **Shipping Street** corridor in Norwich.

GREENLEAF POWER BUYS PLAINFIELD BIOMASS PLANT.

Greenleaf Power announced a purchase agreement with **Leidos, Inc.**, for **Plainfield Renewable Energy (PRE)** located in Plainfield. PRE has a net electricity generation capacity of approximately 37.5 megawatts and can provide baseload renewable energy for 280,000 homes using clean biomass as its fuel. It sells electrical output to **Connecticut Light and Power** under a long-term agreement.



Communication

BERLIN BOARD OF ED WINS COMMUNICATION AWARD. In May, the **Berlin Board of Education** received the **Connecticut Association of Boards of Education’s** 2014 Communications Award in the website category. The district’s technology integration specialist, **Laura Kulpa**, webmasters from each school, and board member **Timothy Oakes** worked together to develop the site. Features include links to school sites, board of education agendas, minutes, schedules and policies, as well as contact information for central office staff and important announcements.

MONTREAL CABLE FIRM TO BUY METROCAST. Montreal-based **Cogeco Cable, Inc.**, will purchase **Harron Communications, LP’s** Connecticut-based **MetroCast Communications**, a provider of cable, internet and phone service, for \$200 million. **MetroCast** serves 70,000 homes and businesses in eastern Connecticut. **Cogeco** will buy the company through its US subsidiary, **Atlantic Broadband**, with the intention of rolling out new services such as **TiVo**. The deal is expected to close in late September.

NEW LAW CREATES STATE BROADBAND OFFICE. The **Connecticut State Broadband Office**, a new agency within the **Office of Consumer Counsel**, was created in July in response to passage of Public Act 15-5. The new agency was charged with facilitating “the availability of broadband access to every state citizen and increas[ing] access to and the adoption of ultra-high-speed gigabit capable broadband networks.” According to **Elin Swanson Katz**, the state’s consumer counsel, the agency will not have regulatory authority. **Katz** announced that the Office has partnered with the **UConn School of Business** to create two internet surveys—one

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) 571-7143, or contact us at acad@ctcase.org.

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for businesses, one for residents—which ask respondents about their internet speed, cost, usage, and satisfaction level with their options. The two surveys are available at <http://www.business.uconn.edu/2015/07/23/connecticut-state-broadband-office-partners-with-uconn-school-of-business/>



Education & Cognition

SCSU TO BAN ALL TOBACCO USE. In May, **Southern Connecticut State University** (SCSU) announced its decision to become a tobacco-free campus later this year, prohibiting smoking and tobacco use, including e-cigarettes, in all SCSU facilities and outdoor campus areas. The policy applies to students, faculty and staff, as well as visitors, contractors and members of the general public.

CT STUDENTS TAKE HONORS AT INTEL FAIR. Four students from **Greenwich** and one from **Bridgeport** won awards at the 2015 Intel International Science & Engineering Fair (ISEF), earning a total of \$90,500 in prizes and scholarships. The fair is the largest pre-college science fair with 1,700 competitors from over 70 countries. The Connecticut winners include **Olivia Hallisey**, **Eunsun Hong**, **Ethan Novek**, **Reid Radulovacki**, and **William Yin**.

UConn LAUNCHES 'ACCELERATE UConn.' In May, **UConn** announced its new **Accelerate UConn** program designed to help students and faculty transform ideas for technology into commercialized products. The program, funded by a three-year, \$300,000 grant from the National Science Foundation, builds upon UConn's existing technology transfer, incubation and commercialization infrastructure. Participants in the Accelerate UConn program will qualify for start-up grants of up to \$3,000.

UConn OPENS BRAIN IMAGING RESEARCH CENTER. The **Connecticut Institute for Brain and Cognitive Science** at **UConn** opened this summer with a \$1 million grant. The Institute is one of several faculty-led initiatives UConn is supporting through the allocation of nearly \$10 million in grants. These grants are part of targeted school investments related to UConn's new Academic Vision. The center will be used to study the brain and dyslexia and ways the brain rewires after an injury. In May, UConn installed a specialized functional magnetic resonance imaging machine to help researchers observe brain activity; the new scanner will offer UConn researchers one of the most advanced imaging platforms available anywhere in the world. **Gerry Altmann**, former longtime editor of the journal *Cognition* and a widely recognized authority in cognitive psychology and cognitive neuroscience, is the institute's co-principal investigator.



Energy

PERMITTING PROCESS FOR BEACON FALLS ENERGY PARK ADVANCES. **CT Energy & Technology, LLC**, completed the first step in the permitting process for its proposed **Beacon Falls Energy Park** by presenting its development plans at a public meeting of the town of **Beacon Falls Land Use Committee** in July. The company next plans to file a Petition for a Declaratory Ruling with the **Connecticut Siting Council**. According to company officials, the project, to be constructed on a 23.8-acre piece of land owned by **O&G Industries** in Beacon Falls, would utilize Danbury-based **FuelCell Energy's** fuel cells and would represent the world's largest renewable energy project, supplanting the 59-megawatt

Gyeonggi Green Energy Fuel Park in South Korea. **CT Energy & Technology** comprises several Connecticut companies including **O&G Industries**. **O&G Industries Power and Energy Division Director Richard Audette** said the plant will contain 21 fuel cell units and be able to generate 63.3 megawatts of energy. It would take three years to complete with construction, tentatively to begin in early 2016, done in three phases.

OXFORD POWER PLANT CLEARED BY SITING COUNCIL, FAA. **Competitive Power Ventures (CPV)**, in partnership with **GE Energy Financial Services**, has cleared two hurdles in its quest to build the 785MW **CPV Towantic Energy Center** in Oxford. In May, the **Connecticut Siting Council** approved the facility, and in June, the Federal Aviation Agency concluded that the two, 150-foot smokestacks at the site would not pose a safety hazard to pilots at the nearby **Waterbury-Oxford Airport**. The plant will be fueled by natural gas, and will generate enough electricity to power more than 750,000 Connecticut homes. Operations are expected to start in 2018.

CT STUDENT GETS PROVISIONAL PATENT FOR SUPER-CAPACITOR. **Peter Russell**, 17, a senior at **Greenwich High School**, has a provisional patent for his super-capacitor, and until the end of the summer to submit the full patent application. Russell's solar-sensitized super-capacitor can capture and store solar energy, eventually superseding some batteries. Russell participates in an honors science research seminar, taught by **Andrew Bramante**, a chemistry and science research teacher recognized for excellence by the **Connecticut State Department of Education**.

RESIDENTIAL ENERGY LABELING PROGRAM LAUNCHED. In June, Connecticut launched a statewide residential energy labeling program using the US Department of Energy's (DOE's) Home Energy Score. **EnergizeCT's Home Energy Solutions** program will provide an energy efficiency score on a scale of 1 to 10 to determine a home's expected energy use, and will recommend efficiency improvements to residents and homebuyers. The state intends to evaluate between 12,000-14,000 homes annually, helping to meet the goal of weatherizing 80% of homes by 2030.

REGIONAL YMCA PURCHASES CHP SYSTEM. This spring, the **Regional YMCA of Western Connecticut** purchased a CM-75 combined heat and power (CHP) system from Tecogen® Inc. The system will supply 75 kW of electricity while also providing space heat, hot water and pool heating, saving the YMCA \$65K annually. In addition, because the Y participates in Connecticut's **Commercial Property Assessed Clean Energy (C-PACE)** program, administered by Connecticut's Public Utilities Regulatory Authority, the equipment will pay for itself in four years.



Environment

UConn TEAM FINDS FISHING IMPACTS EVOLUTION OF FISH SPECIES. A team of researchers led by **Jan-Michael Hessenauer** and **Jason Vokoun** of **UConn's Department of Natural Resources and the Environment** recently published an article in *PLOS One* showing that recreational fishing has an impact on the evolution of fish species, with largemouth bass becoming less active over time. Comparing largemouth bass from lakes that are fished with those that are protected, researchers found that a significantly higher number of fish taken from the lakes where fishing was allowed had lower metabolic rates compared with the fish taken from protected bodies of water. According to **Robert Jacobs**, a co-author and Eastern District supervisor for the **Inland**

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Fisheries Division of the **Connecticut Department of Energy and Environmental Protection**, the findings may have implications for fish management practices.

JAPANESE BARBERRY CONTROL KEY TO TICK MANAGEMENT.

The Japanese Barberry, an invasive Connecticut plant, attracts ticks and is problematic where the plant species covers large acre-size thickets, according to researcher **Jeff Ward**, a chief scientist at the **Connecticut Agricultural Experiment Station**. Ward found that controlling barberry is essential to reducing exposure to tick viruses.

AT SCSU, REFUGE FOR BATS. In June, **Miranda Dunbar**, a professor at **Southern Connecticut State University (SCSU)**, and senior **Christopher Wisniewski** placed three bat houses on campus to save some of the dwindling Connecticut bat population dying from white-nose syndrome. The boxes are free of the fungus causing white-nose syndrome. The little brown bat, which has been the most common species in some regions of Connecticut, "is now considered for the endangered-species list" noted Wisniewski. White-nose syndrome has been confirmed in 26 states and five Canadian provinces, is suspected in two more states and is headed for the Rocky Mountains. However, Dunbar said, "We are definitely in the epicenter of this disease."

NEW LAW TARGETS MICROBEADS. Public Act 15-5, effective from passage on June 30, 2015, calls for the **Connecticut Department of Energy and Environmental Protection** to engage the **Connecticut Academy of Science and Engineering (CASE)** to conduct a study on biodegradable microbeads upon application of a manufacturer(s). The purpose of the study is to determine if a biodegradable microbead used in a personal care product does not adversely impact the environment or publicly owned treatment facilities in the state. Manufacturers must apply by August 15, 2016, to be included in the study, with the study to be submitted to DEEP's commissioner no later than December 15, 2017. The study will be funded by application fees paid by manufacturers.

LAWMAKERS PASS 'BLUE PLAN' TO HELP PROTECT NATURAL RESOURCES. "An Act Concerning a Long Island Sound Blue Plan and Resource and Use Inventory" (Public Act No. 15-66), which took effect July 1, will create a so-called "Blue Plan" to prioritize the protection of natural resources and uses such as fishing, aquaculture and navigation, from future conflicting or incompatible activities without creating new regulatory restrictions on them. The **Connecticut Department of Energy and Environmental Protection** and **UConn** will convene relevant state agencies, academic institutions, and stakeholders to develop a plan to guide future uses of the **Sound's** waters and submerged lands. "...By taking action now, we are planning for our long-term future, protecting our environmental resources while making economic smart decisions," Governor **Dannel Malloy** said.

IMPORTED INSECTS, FUNGI TAKE ON ASH BORERS, MOTHS, WATERMILFOIL. This summer, Connecticut environmental scientists are using wasps from China to help control the Emerald Ash Borer. The hope is that the wasps—close to 20,000 were released in various borer-infested locations around Connecticut last year—will be able to contain the borer. Scientists are also experimenting with a Japanese fungus to attack gypsy moths, European parasitic technid flies to combat a new threat from winter moths, and Asian grass carp to curb invasive watermilfoil in **Candlewood Lake** and **Ball Pond** in New Milford. Additionally, **Claire Rutledge** of the **Connecticut Agricultural Experiment Station's** entomology unit confirmed that samples from **Westport** contained the activity and

beetle remains of the Southern Pine Beetle (SPB) in nine Eastern White Pines on **Cross Highway**. The trees were immediately removed. These recently discovered beetles are the first confirmed case of SPB attacking Eastern white pine in Connecticut.



Food & Agriculture

FOOD GROUP PARTNERS WITH MEDICAL COMMUNITY TO ADDRESS HUNGER.

The **Connecticut Food Policy Council** is partnering with the state's medical community in an effort to end hunger. At a workshop this spring sponsored by the Council at Middlesex Community College, USDA Undersecretary Kevin Concannon noted that short of the Great Depression, the nation has never needed programs to provide food to underprivileged communities as much as it does now. State hospitals, food policy councils, public health experts, medical professionals and other community-based organizations heard from leading national experts on the subject of "Hospital-Community Collaboration for Community Health: Expanding Access to Nutritious Foods." The statewide meeting, the first of its kind in the nation, was in response to the Affordable Care Act and the Internal Revenue Service's final ruling on nonprofit hospitals' community health needs assessment obligations.

FARMERS' MARKETS KEY TO REVITALIZED AGRICULTURE.

According to recent reports, Connecticut has 125 certified farmers' markets with an additional 20 that are not certified. Certified markets have the benefits of promotion by the state and can use the "Connecticut Grown" logo. **Connecticut Department of Agriculture** Commissioner **Steven K. Reviczky** said the markets are a big part of Connecticut's revitalized agriculture. Although farmers markets are important to farmers and Connecticut's economy, they are only part of the effort to sustain the state's agricultural viability. **Henry Talmage**, executive director of the **Connecticut Farm Bureau** and co-vice chair of the **Governor's Council for Agricultural Development**, said the state has come a long way from 20 years ago when farms were being lost at an alarming rate. The state has actually gained farms, from about 5,000 to 6,000 in recent years.

AG STATION CATALOGS CT'S WILD BEES. Researchers at the **Connecticut Agricultural Experiment Station** have recently cataloged more than 300 species of wild bees in Connecticut; however, at least four native bee species have disappeared from Connecticut since 1997, likely due to human activity. A recent survey found that close to 60% of Connecticut's honeybees died over the summer of 2014 and the winter of 2015 and researchers are now discovering that wild bees may be suffering the same sorts of problems, including pesticides and habitat changes. The study will be submitted to the *Journal of the Kansas Entomological Society* and is part of a project to create an international bee database.

DAIRY FARM FIRST TO USE ROBOTIC TECHNOLOGY FOR MILKING. **Freund Farm** in northwest Connecticut will be the first dairy farm in Connecticut to use robotic technology to milk their cows. The Friends expect to complete construction of a new barn next spring with the robots, making milking available to the cows—who are trained to seek out the robot at milking time—24 hours a day. Robotic milking is a growing trend, said **Wayne Kasacek** of the **Connecticut Department of Agriculture**.

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Health

CT FIRM TO PARTNER WITH HEALTHCARE GROUP FOR FLU VACCINE. Protein Sciences Corporation will partner with the Connecticut Association for Healthcare at Home to bring Flublok® influenza vaccine to home health and hospice agencies across the state for the 2015–2016 flu season, according to an announcement from the association. “Ensuring that Connecticut’s 20,000 home health and hospice agency employees have access to the Flublok vaccine for both their patient population as well as for themselves is a positive step toward the goal of limiting exposure and spread of the flu,” said Deborah Hoyt, president and CEO of the association.

STUDY TRACKS ALCOHOLIC DRINKING RATES AT COUNTY LEVEL. The first study to track drinking at the county level found rates of heavy drinking in Connecticut spiked 21.3% between 2005 and 2012, while binge-drinking rates rose nearly 14%, with the largest increases among women drinkers. The study found Litchfield and Middlesex counties had the highest proportion of heavy drinkers in 2012—10.8% of adults—with New Haven and Hartford counties having the lowest at less than 8%. The study, published in the *American Journal of Public Health*, was led by the Institute for Health Metrics and Evaluation at the University of Washington.

HARTFORD RANKED 11th FITTEST CITY. According to a study by the American College of Sports Medicine (ACSM), the Greater Hartford metropolitan area is the 11th fittest city in the nation this year, up one spot from 2014. Hartford scored ahead of Salt Lake City, and just behind San Jose, California, in ACSM’s American Fitness Index of the nation’s largest 50 metropolitan areas, based on low death rates for cardiovascular disease and diabetes, a high percentage of parkland and recreational amenities, and the requirement for physical education in schooling.

REVIEW ASSESSES EXERCISE RECOMMENDATIONS FOR HYPERTENSION. A recent review by CASE member Linda S. Pescatello and her team assessed the existing professional exercise recommendations for hypertension, including reasons for differences in the recommendations, gaps in the literature, and future research needs. A recurrent theme was a lack of evidence on many issues surrounding exercise prescription for hypertension. Nonetheless, the consensus from various professional recommendations is for adults with pre-to-established hypertension to participate in more than 30 minutes a day of moderate intensity, aerobic exercise on most, if not all, days of the week, to total more than 150 minutes a week.



High Technology

BOND COMMISSION APPROVES TECH PARK FUNDS. On May 11, the State Bond Commission approved \$131.5 million for construction of the Innovation Partnership Building, the first building in UConn’s new, 900,000 square foot Technology Park on the university’s Storrs campus. The building is expected to be completed in the first quarter of 2017, and will offer specialized equipment and shared laboratory space for UConn researchers, industry scientists and businesses.

ANWAR NAMED JEFFERSON SCIENCE FELLOW. CASE member Mehdi Anwar, a professor of electrical and computer engineering at UConn, was selected as a Jefferson Science Fellow by the National Academies of Sciences, Engineering and Medicine for 2015-2016. Anwar has served as Associate Dean for Research

& Graduate Education, UConn School of Engineering, founding director of the Department of Homeland Security Center of Excellence (2007-2009), interim director of the Connecticut Global Fuel Cell Center and interim department head of ECE. The Jefferson Science Fellows program was established in 2003 by the Office of the Science and Technology Adviser to the US Secretary of State.

CI NAMES NEW CEO. Matthew McCooe has been named new chief executive officer of Connecticut Innovations Inc. Previously, McCooe was a managing partner and fund manager for Chart Venture Partners (CVP). McCooe has an MBA from the Columbia University Graduate School of Business and a BA from Boston College. He has served as a Small Business Innovation Research reviewer for the National Science Foundation and the Department of Energy Innovation Ecosystem Initiative.



Transportation

NEW ‘CHEAPR’ REBATE PROGRAM ANNOUNCED. Governor Dannel Malloy this spring announced the Connecticut Hydrogen and Electric Automobile Purchase Rebate Program—or “CHEAPR”—initiative, which provides cash rebates up to \$3,000 for Connecticut residents, businesses, and municipalities who purchase or lease an eligible electric vehicle (EV). Funds for the EV Connecticut CHEAPR pilot program, administered statewide by the Center for Sustainable Energy, come from \$1 million made available to the state by an agreement allowing the merger of Northeast Utilities and NSTAR in 2012.

DOOSAN TO PROVIDE ENERGY SYSTEMS TO CTTRANSIT. South Windsor-based Doosan Fuel Cell America, Inc., a developer of hydrogen fuel cells, recently announced it has been selected to provide energy systems to CTTransit. The energy systems will be located at the organization’s Hamden maintenance and storage facility. The Connecticut Department of Transportation has cited environmental sustainability as a priority and believes fuel cell technology could significantly reduce emissions while producing significant electrical power through consumption of hydrogen fuel.

NEW HAVEN LAUNCHES ‘GO NEW HAVEN GO.’ New Haven city officials recently announced a new transportation initiative, “Go New Haven Go,” which offers a transit pre-tax benefit program for city employees, with the potential to be adopted by other city businesses. The city also offers “Nu ride,” a carpooling program in which participants can record trips, and gain points redeemable at restaurants and destinations throughout the city.

\$24.9M APPROVED FOR ‘LET’S GO CT!’ The State Bond Commission in July approved \$24.9 million for the state’s “Let’s Go CT!” initiative to modernize the state’s transportation infrastructure. The first group of projects includes \$10 million for widening I-84 in Danbury between exits 3 and 8; \$7 million to install real-time location devices on all public transit buses; \$4 million for construction of a new dock yard on the Danbury Branch Rail Line in Norwalk; \$1 million to improve the interchange of I-91, I-691 and Route 15 in the Meriden and Middletown area; and \$1 million to improve the I-84 and Route 8 interchange. Other projects include \$500,000 to study expanding bus service to areas not currently served by public transit; \$500,000 to expand CTfastrak east of Hartford into Manchester; \$500,000 to study centralized paratransit service coordination, and \$400,000 to review implementation of a bus rapid transit corridor for Route 1 between Norwalk and Stamford.

—Compiled and edited by Wendy Swift

Flood Insurance Reform Act of 2012 and subsequent legislation, these subsidies will be phased out and new premiums will be required to reflect actual flood risk. As a result, many policies will see substantial rate increases, especially for structures that exist below the NFIP benchmark elevation for floodplain management.

A new report from the National Research Council, *Tying Flood Insurance to Flood Risk for Low-Lying Structures in the Floodplain*, reviews current NFIP methods for calculating risk-based premiums as they relate to these low-lying structures, and evaluates alternative approaches that would improve the accuracy and fairness of flood insurance rates. The report also identifies critical data needs for calculating risk-based rates and discusses the feasibility and cost of implementing the alternative approaches.

A related report from the National Academies of Sciences, Engineering and Medicine, produced at the request of FEMA, entitled *A Community-Based Flood Insurance Option* identifies a range of key issues and questions that would merit consideration and further analysis as part of a community-based flood insurance program. As the report describes, the community-based option offers potential benefits, such as the prospect of providing coverage for all (or nearly all) at-risk residents and properties in flood-prone communities. At the same time, many current challenges facing the NFIP may not necessarily be resolved by a community-based approach. This report discusses these and other prominent issues to be considered and further assessed.

http://www.nap.edu/openbook.php?record_id=21720
http://www.nap.edu/openbook.php?record_id=21758

◆ Assessing Impacts on Resources and Climate of Projected Economic and Population Growth Patterns

Global economic and population growth are driving energy, land, and water use, and there are complex connections between the use of these resources and the world's climate and natural environment. A significant engineering challenge is to develop and deploy technologies that reduce human impact on the environment and make better use of resources while remaining robust in the face of unavoidable environmental change. Without significant changes in resource use patterns, projections indicate that fossil fuel use will continue to rise, more land will be converted for crops, and water stress will increase in many areas already subject to water shortages. Even in the absence of climate and environmental change, these trends would lead to stress on water resources and natural systems as well as temperature increases of 3°C to as much as 8°C depending on the region and climate sensitivity. Higher global temperatures would be associated with an overall increase in global precipitation (because a warmer climate speeds up the hydrological cycle, meaning more evaporation and more precipitation), but water runoff in many already water-stressed areas could be reduced, contributing to further water stress, with consequences for energy and food production. This article, in the summer 2015 issue of *The Bridge* from the National Academy of Engineering, presents a review of several key aspects of current global development to quantitatively describe how economic development drives energy, land, and water use and how the use of these resources may affect climate and the availability of resources.

<http://www.nae.edu/Publications/Bridge/140630/140637.aspx>

◆ New Report Recommends Strategies to Improve Cardiac Arrest Survival Rates

Each year, cardiac arrest strikes more than half a million people and contributes to avoidable death and disability across the United States; it affects seemingly healthy individuals of all ages, races, and genders, often without warning. Defined as a severe malfunction or cessation of the electrical and mechanical activity of the heart,

cardiac arrest results in almost instantaneous loss of consciousness and collapse. Following a cardiac arrest, each minute without treatment decreases the likelihood of survival with good neurologic and functional outcomes. Thus, the consequences of delayed action can have profound, and in many cases, avoidable ramifications for individuals, families, and communities. The Institute of Medicine conducted a study on the current status of, and future opportunities to improve, cardiac arrest treatment and outcomes in the United States. This report examines the complete system of response to cardiac arrest in the United States and identifies opportunities within existing and new treatments, strategies, and research that promise to improve survival and recovery of patients.

http://books.nap.edu/openbook.php?record_id=21723

◆ The Promise of Solar Energy: New Developments Offer New Challenges and Opportunities

The promise of solar energy rests in the unmatched size of the solar resource: more energy from the sun strikes the Earth in one hour than all of the energy consumed on the planet in an entire year. As with all energy sources, challenges for solar energy use reside in the cost of extraction.

Three main technologies for solar energy use involve

- solar electricity production by photovoltaics
- solar thermal systems that produce electricity or process heat as their primary outputs; and
- nonbiological systems that mimic the process of photosynthesis through direct production of fuel from sunlight.

The status of these technologies, and the physical principles that underlie their operation, were described in a widely distributed report commissioned by the US Department of Energy, *Basic Research Needs for Solar Energy Utilization*. This article provides an update on many significant subsequent developments, and identifies the challenges and associated opportunities for further research and engineering, in each of the three approaches. This article, appearing in the Summer 2015 issue of *The Bridge* from the National Academy of Engineering, provides an update on many significant subsequent developments, and identifies the challenges and associated opportunities for further research and engineering, in each of the three approaches.

<http://www.nae.edu/Publications/Bridge/140630/140646.aspx>

Connecticut Student Among 2015 EngineerGirl 'Engineering in Sports' Essay Contest Winners

The National Academy of Engineering recently announced the winners of its 2015 EngineerGirl national essay competition. This year's national contest asked students in grades three to 12 to describe the engineering behind a technology used in playing, scoring, or training for a chosen sport. Prizes were awarded to students in three categories based upon grade level.

Abby Mauer, a fifth-grader from Shawnee, Kansas, placed first among third- to fifth-grade students for her essay on improving volleyball through engineering. Seventh-grader Rebecca Yermish from Marlton, New Jersey, won first place in grades six to eight for her essay describing the roles of design and manufacturing/process engineers in developing arrows for archery.

Among ninth- to 12th-graders, Isabelle Breier, an 11th-grade student at Hopkins School in New Haven, Connecticut, placed first for her explanatory essay about engineering innovation in ballet shoes.

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Submarines *(from page 1)*

concepts that run continuously in a “drop in” format. Past topics included buoyancy, air pressure, internal combustion, and gyroscopic force. Tours of the exhibits are offered to the public on most Saturdays throughout the summer with no prior registration necessary.

Groups such as schools, scouts or summer camps can arrange guided tours, classroom activities and scavenger hunts by contacting the museum’s education department. Classroom activities for groups include hands-on programs such as “Oars to Atoms,” a look at the development of submarine propulsion through the ages and “Navigation or, Where are we anyways?” that examines the different methods people have used to figure out their location on the Earth.

All of the museum’s programs are provided free of charge and more information can be found at www.usnautilus.org, the Submarine Force Museum Association’s website.



*An aerial view of the Nautilus and the Submarine Force Museum, the only museum operated by the US Navy.
[Graphic: Submarine Force Museum]*