

# NEWS in Science and Technology



from the

## CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

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The following is an Executive Summary of the Academy's quarterly Bulletin (Vol. 22,2) that includes topics and issues in science and technology deemed by the Academy to be both timely and relevant to Connecticut's interests. Each item is briefly summarized from press releases and reports of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. Hyperlinks are included to the original online source, where more detailed information is available.

NOTE: Online versions of this newsletter and the Bulletin are available on the Academy website at [www.ctcase.org](http://www.ctcase.org).

### FEATURE ARTICLE

#### ➤ Biodiesel Holds Promise as New Energy Source, Economic Boon for Connecticut

*The potential of biodiesel, both as a source of energy and as a boost to business and agriculture in Connecticut, has created a great deal of activity during the past year. A facility that processes soybean oil into biodiesel has opened in Bethlehem, the General Assembly has held several public hearings on biofuels and how to encourage production, and The Connecticut Agricultural Experiment Station (The Experiment Station) and the University of Connecticut (UConn) are pursuing research that could assist the fledgling industry.*

- Biodiesel comes from processing vegetable oils, not petroleum.
  - Vast potential market in state because it can be used in place of non-renewable, petroleum-based diesel fuel and home heating oil.
  - Benefits include reduced emissions of soot, sulfur from biodiesel vehicles; 30% reduction in carbon monoxide; no net carbon dioxide gain because carbon dioxide released by burning biodiesel was originally captured from the air by the plants.
  - More efficient to produce and use than ethanol produced from corn as fuel source; biodiesel produces three times the energy used to produce it.
  - To be widely accepted, must meet ASTM definition and standards for biodiesel.
    - UConn and The Experiment Station working together to set up labs for ASTM testing: UConn focusing on physical characteristics, Experiment Station focusing on elemental analyses.
- Biodiesel research began at UConn five years ago when student interested in air pollution became curious about biodiesel.
  - First 5-gallon batch made from waste cooking oil.
  - Small lab established in response to queries made by chemistry professor James Stuart; later became Biodiesel Consortium.
  - UConn filed for patent for four-stage processing method developed by Richard Parnas of Chemical Engineering Program that could produce biodiesel continuously.
- The Experiment Station began research in 2006 in response to inquiry from legislators for study of potential for soy and rapeseed production in state to help improve biodiesel market.
  - Current feedstock in state comes from soybean oil, but sunflower, canola, rapeseed, palm, waste cooking oil can all be used.

- Experiment Station scientists researching specific varieties and methods, seeking varieties of canola and rapeseed that yield highest percentages of recoverable oils.
- Rapeseed possible alternate winter crop; canola may produce glucosinolates, which in soil may turn into compounds toxic to plant parasitic nematodes, fungi.

- General Assembly considering comprehensive program—including \$1.3 million appropriation for UConn, Experiment Station—to encourage biodiesel research, production and use.

*[Editor's Note: As of press time, the General Assembly was still in session and this legislation was still pending.]*

[[http://www.ctcase.org/bulletin/22\\_2/22\\_2.pdf](http://www.ctcase.org/bulletin/22_2/22_2.pdf)]

### CONNECTICUT SCIENCE CENTER UPDATE

#### *It's Not Science Fiction Anymore!*

On April 18, the Connecticut Science Center celebrated a historic construction milestone as the building's first steel beam was hoisted into place. In all, nearly 2,500 tons of steel will form the superstructure of the 144,000 square-foot signature building designed by world-famous architect Cesar Pelli. To celebrate this momentous occasion, the Science Center invited the community to sign one of the beams at an event that coincided with the National Bring Your Son & Daughter to Work Day. Hundreds of people joined in the festivities and left their mark behind.

#### *Educator Resources*

Although the Science Center won't open until 2008, it has already begun to offer educational resources to teachers and parents. A series of science education videos, "The Science of Building," are offered on the Center's website at [www.CTScienceCenter.org](http://www.CTScienceCenter.org), along with classroom activities that support the statewide Connecticut Science Framework. The newest video is all about the science of steel. This five-minute educational video documents the massive, yet incredibly coordinated, job of manufacturing the building's steel. Science of Steel is particularly applicable to 8<sup>th</sup> grade science learning, because of the bridge-building component to the curriculum, and to 10<sup>th</sup> grade because of the chemistry focus.

#### *Two Webcams*

Construction of the new Connecticut Science Center can now be watched live via a new webcam recently installed at Riverpoint in East Hartford. This webcam, which complements one that is already in place at the Marriott Hartford Downtown, provides an impressive view of the steel superstructure as it begins to rise almost eight stories into the city's skyline.

## NEWS FROM THE NATIONAL ACADEMIES

### ➤ NAS Joins International Call for World Leaders to Address Global Climate Change, Energy Access

*On May 16, 2007, the National Academy of Sciences joined national science academies of a dozen other nations in calling on world leaders — particularly G8 leaders who met in early June — to address global climate change and energy-access issues by promoting low carbon-emission energy systems and more efficient use of energy. The academies also urged leaders to facilitate scientific and technical innovation, and to simplify and enforce a balanced intellectual property regime. The academies issued joint statements on “Growth and Responsibility: The promotion and protection of innovation” and “Growth and responsibility: sustainability, energy efficiency and climate protection.”*

[<http://www.national-academies.org>]

### ➤ Environmental Impacts of Wind Energy Projects

*A new congressionally mandated report from the National Research Council finds that although the use of wind energy to generate electricity is increasing rapidly in the United States, government guidance to help communities and developers evaluate and plan proposed wind-energy projects is lacking. The report offers an analysis of the environmental benefits and drawbacks of wind energy, along with an evaluation guide to aid decision-making about projects. As a case study, the committee that wrote the report looked at the mid-Atlantic highlands, a mountainous area that spans parts of West Virginia, Virginia, Maryland, and Pennsylvania. The report does not examine the impact of offshore wind-energy projects.*

[[http://books.nap.edu/catalog.php?record\\_id=11935](http://books.nap.edu/catalog.php?record_id=11935)]

### ➤ New Science of Metagenomics May Revolutionize Understanding of Microbial World

*According to a new report from the National Research Council, the emerging field of metagenomics—where the DNA of entire communities of microbes is studied simultaneously—presents perhaps the greatest opportunity since the invention of the microscope to revolutionize understanding of the microbial world. The report calls for a new Global Metagenomics Initiative to drive advances in the field in the same way that the Human Genome Project advanced the mapping of our genetic code. According to the report:*

- Metagenomics will “transform modern microbiology” by giving scientists tools to study entire communities of microbes and how

they interact to balance the atmosphere’s composition, fight disease, and support plant growth.

[[http://books.nap.edu/catalog.php?record\\_id=11902](http://books.nap.edu/catalog.php?record_id=11902)]

### ➤ VA Urged to Revise Methods for Evaluating, Compensating Vets for PTSD

*To ensure more consistent and appropriate disability compensation for veterans, the US Department of Veterans Affairs (VA) needs to revise how it evaluates former military personnel for service-connected post-traumatic stress disorder (PTSD) and how it determines the payment amounts they merit, according to a new report from the Institute of Medicine and National Research Council. The report found*

- Surge in number of PTSD disability claims reveals inconsistencies in compensation levels across nation, raising questions about effectiveness of VA’s current methods for assessing and rating PTSD and whether some vets are getting too much compensation, others too little and some receiving unmerited compensation.
- VA urged to
  - develop new methods and rating criteria specific to PTSD.
  - base compensation on how greatly PTSD affects all aspects of vet’s life, not just ability to work.

[[http://books.nap.edu/catalog.php?record\\_id=11870](http://books.nap.edu/catalog.php?record_id=11870)]

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