

NEWS in Science and Technology

from the



CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

Vol. 7, No. 1 / Spring 2008

The following is an Executive Summary of the Academy's quarterly Bulletin (Vol. 23,1) 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.

FEATURE ARTICLE

➤ 300,000 Premature Deaths Attributed to Obesity: Brownell and the Rudd Center Work to Improve the World's Diet

CASE member Kelly Brownell, co-founder and director of the Rudd Center for Food Policy and Obesity at Yale University, says he considers that number, "high and alarming, and especially alarming in children." Brownell predicts a 40% increase in the United States' already extremely high rate of diabetes over the next 25 years. Brownell and his colleagues use "creative connections between science and public policy, targeted research, and frank dialogue among key constituents" to achieve the Rudd Center's mission of

- Improving the world's diet
- Preventing obesity
- Reducing weight stigma

A Key Misconception — "Making people feel bad about their weight is an acceptable and effective form of motivation." A study by Brownell and colleagues of 2,000 people partaking in a weight-loss program showed that those who felt stigmatized reacted by eating more and giving up on losing weight. The Rudd Center website offers three strategies for combating this perception:

- Conducting research to demonstrate the effects of stigmatization
- Addressing it as a prejudice
- Building a coalition to fight prejudice

Fix the Message, A Focus on Health Instead of Beauty —

Americans are bombarded by messages promoting sculpted bodies and encouraging diet trends, while media messages also encourage us to eat more, which Brownell says results in an unhealthy relationship with food. The Rudd Center is working to correct this through

- Structuring public health messages to have the intended positive effect of changing attitudes toward food and eating.
- The formation of a "Safe Space," for food industry leaders, legislators and public health advocates to have meaningful dialogue about promoting health foods while maintaining profitability.
- Monitoring the impact of efforts by the food industry to encourage healthy eating, since at the core of the Rudd Center's interest is "to praise real progress and critique efforts that have no impact, block progress, or increase consumption of unhealthful foods."

Other Issues Being Addressed — Education is only part of the fight against childhood obesity. Brownell recommends

- Restoring physical education in those schools where it has been removed
- Removing trans fat from children's diets

Brownell points out that restaurants are the new family dinner table with Americans eating almost 30% of their meals outside the home each year. The Rudd Center encourages

- Labeling and nutritional information on restaurant menus

Visit the award-winning website of the Rudd Center for Food Policy and Obesity at www.yaleruddcenter.org for comprehensive information about a diverse range of food- and policy-related topics, including educational materials, food facts and information on science, medicine, food and agriculture.

[http://www.ctcase.org/bulletin/23_1/23_1.pdf]

NEWS FROM THE NATIONAL ACADEMIES

➤ Low-Level Nitrogen Pollution More Harmful Than Originally Thought

Nitrogen-rich fertilizers, widely used in agriculture, have been shown to reduce biodiversity when applied even in low amounts, according to a study appearing in the journal *Nature*. The 20-year study examined the biodiversity of agricultural plots. Plots exposed to a slow fertilization with nitrogen showed a 17% drop in the number of plant species, compared with control plots. Significant signs of recovery showed when nitrogen deposition was stopped midway through the study, suggesting that much of the damage can be undone if fertilizer use is reduced or halted.

[<http://www.nationalacademies.org/headlines/20080215.html>]

➤ US Climate Change Research Program: Progress in Documenting Changes; Lagging in Impact on Humans

Climate change research directed by the federal government has made progress in documenting and understanding temperature trends and related environmental changes on a global scale, according to a report from the National Research Council. However, efforts to understand the impact of such changes on society and analyze mitigation and adaptation strategies are still relatively immature, added the committee that wrote the report. Moreover, the US Climate Change Science Program (CCSP), which oversees federal research in this area, has made inadequate progress in supporting decision making, studying regional impacts, and communicating with a wider group of stakeholders.

The committee noted that adjustments will have to be made in the balance between basic science and applications if CCSP is to achieve its vision of producing information that can be used to formulate strategies for preventing, mitigating, and adapting to the effects of climate change. It did not offer recommendations, something expected to be considered in a follow-up report.

[http://infocusmagazine.org/7.3/rp_ccsp.html]

➤ New Study Examines Benefits of the Satellite Age

A new National Research Council report catalogs scientific achievements and corresponding benefits to society made possible by the first five decades of the satellite age. Since the 1960s, when “geo-stationary” satellites were first launched, no hurricane anywhere in the world has gone undetected. Satellites have proved invaluable to climate science researchers. Satellite radiometers measure energy entering and leaving Earth; as these devices improved, fluctuations in this energy “budget” could be measured and linked to particles from volcanic eruptions or atmospheric greenhouse gases. Satellite data also provided a record of global ocean and air temperatures, and led to new revelations of ice sheet flow. The report echoes concerns raised in earlier Research Council studies that current delays and cancellations in US satellite missions are a setback for science.

[http://infocusmagazine.org/7.3/eng_satellites.html]

➤ Report Cites Success of US Plant Genome Sequencing Initiative, Urges Broader Mission

A new report by the National Research Council concludes that the first decade of the National Plant Genome Initiative (NPGI)—a unique, cross-agency funding enterprise for plant genomics coordinated by the federal, multi-agency Interagency Working Group on Plant Genomes—has seen revolutionary breakthroughs in genome sequencing for various plants and their pathogens.

NPGI has contributed to a better understanding of how plants function and how to develop desirable plant characteristics. The technologies and information developed by NPGI and the National Science Foundation’s (NSF) Arabidopsis 2010 Project are the primary platforms for basic research in fundamental plant science—including genetics, biochemistry, physiology, developmental biology, evolutionary biology, and population biology. Important research breakthroughs such as how plant immune systems control pathogen defense are evidence that these programs should continue with a broadened mission in order to increase the contribution of plant science to vital areas of national interest, according to the committee that wrote the report.

[http://www.nap.edu/catalog.php?record_id=12054]

➤ NASA’s K-12 Education Program Falling Short

A new National Research Council report concludes that NASA’s Office of Education is not as effective as it could be in raising interest among primary and secondary education students in science, technology, and engineering. The report recommends that NASA work to develop a culture of ongoing improvement, cultivate sustained partnerships that bring in outside education experts, and use information and communication technology more effectively. In addition, some programs should

CONNECTICUT SCIENCE CENTER UPDATE

As the new Science Center gears up for opening, preparations for field trip visits are well underway. Teachers planning a field trip to the Center are invited and encouraged to attend professional development workshops offered this summer by the Center. These workshops are opportunities for teachers to learn about the field trip programs at the Science Center and the pre- and post-visit materials for use in their classroom, resources that complement the exhibit experiences and align with the Connecticut State Science Framework Standards. To learn more about these workshops and field trips, please visit www.learn.ctsciencecenter.org/Educator/Info

be restructured to capitalize on the agency’s own expertise and on new technologies.

Education and public understanding of science are receiving increasing attention because of the need to develop a strong scientific and technical workforce in a competitive global economy. The National Science Foundation and the US Department of Education hold the lead federal role in (STEM) education. NASA does have an important complementary role which is closely linked to and guided by the core scientific, engineering, and exploration missions of the agency.

[http://www.nap.edu/catalog.php?record_id=12081]

➤ New Web Resource for Drinking Water

The National Academy of Sciences and the Global Health and Education Foundation joined with science, engineering, and medical academies around the world to launch “Safe Drinking Water Is Essential” (www.drinking-water.org) — an online resource for decision makers with easily accessible, peer-reviewed scientific and technical information about the options for enhancing the safety and availability of drinking water supplies. The interactive site offers in-depth information on the sources of drinking water, common naturally occurring and human-induced contaminants, distribution problems, and treatment options. There are also case studies and an atlas providing global and regional views of access to safe water in urban and rural areas.

More than 125 science, medical and engineering academies worldwide are disseminating information about “Safe Drinking Water Is Essential,” to ensure that this vital knowledge reaches people who need it most.

[<http://infocusmagazine.org/7.3/spotlight.html>]

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