

NEWS in Science and Technology

from the



CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING

Vol. 4, No. 3 / Fall 2005

The following is an Executive Summary of the Academy's quarterly Bulletin (Vol. 20,3) 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: Connecticut's Business Incubators

➤ Incubators Form Critical Links to Technology Innovation

Connecticut is pinning some of its economic dreams on its ability to become a leading commercial innovation center that can compete in world markets, and one of the mechanisms that is helping the state's innovation culture gain traction is the business incubator.

- Incubators are entrepreneurial support systems that nurture fledgling companies until they can survive and "fly" on their own.
 - Typically provide some form of office and lab space, business services, intensive mentoring;
 - Startup companies seek "creative environment with like-minded people"; this "social networking" a critical aspect of incubators.
 - Connecticut Business Incubator Network (CBIN) allows incubators to "share best practices," collaborate.
- Three of the six incubators currently in Connecticut are:
 - University of Connecticut Technology Incubation Program (TIP) founded in 2002 as part of Office of Technology Commercialization
 - Funded by both UConn and monthly fees paid by companies.
 - Advanced Technology Laboratory located in BioScience Complex, with additional space at Farmington and Avery Point campuses.
 - Companies must have UConn connection; have two years to come up with business plan; must leave after three years
 - If UConn intellectual property becomes basis of a new company, licensing and revenue sharing arrangement required between the company, UConn and the inventor.
 - Institute of Technology and Business Development (ITBD) founded in 1993 at Central Connecticut State University (CCSU)
 - 18 companies using 25,000 square feet of space
 - "Lifecycle" collaboration process provides opportunities for networking
 - Requires business plan, proof of liability insurance, balance sheet, one-year lease; tenants can stay five years.
 - Self-supporting through fees for additional services such as Conference Center, Business Resource Center.
 - Connecticut Center for Advanced Technology (CCAT) Innovation Center, recently established as part of renovation and revitalization of Rentschler Field

- Lasers, photonics, nanotechnology, fuel cells, medical devices and next generation manufacturing identified as technologies around which companies can be gathered to create a "hothouse" atmosphere that fosters growth.
- Tenants pay leases and can remain for three years

[See http://www.ctcase.org/bulletin/20_3/incubators.html]

EDUCATION

➤ New Evolution Resource Website Launched

The National Academies have designed a new Web page — <http://www.national-academies.org/evolution> — to allow easy access to books, position statements, and additional resources on evolution education and research. The National Academies have long supported the position that evolution should be taught as a central element in any science education program. Currently there are challenges to the teaching of evolution in some 40 states or local school districts.

[<http://www.nationalacademies.org/morenews/20050613.html>]

UConn Physicist William Stwalley Receives 2005 Connecticut Medal of Science

On September 28, Academy member William C. Stwalley, Board of Trustees Distinguished Professor and head of the University of Connecticut's (UConn) physics department and director of the UConn Laser Facility, will be awarded the Connecticut Medal of Science by Governor M. Jodi Rell at the Alliance for Connecticut Technology Innovation Day and Award Dinner.

Stwalley's research has helped pave the way for some of the most exciting developments in physics today. He has played a seminal role in the creation of a new subfield of physics that bridges atomic and molecular physics, condensed matter physics, and the evolving field of nanoscience, and has pioneered the development of precise laser spectroscopic techniques for accurately determining the forces of interaction between two atoms.

He has an extraordinary record of sustained achievement both in his own research and in his encouragement and support of fellow scientists. The ultracold-research group at UConn, which he leads, is one of the largest in the world and has an established international reputation for excellence. The study of ultracold matter is one of the frontiers of physics today; its potential impacts range from fundamental science to important new applications such as quantum computing and improved clocks, interferometers and gyroscopes.

ENVIRONMENT

➤ Assessing Safety and Security of Spent Nuclear Fuel Storage in the US

Responding to concerns that spent nuclear fuel rods could potentially be used to make “dirty bombs” or that the cooling pools in which these rods are stored at US nuclear plants could become targets for terrorists, Congress last year asked the National Academies to convene a group of experts to examine the safety and security of spent nuclear fuel stored at the nation’s commercial nuclear power plants. The report found:

- While the cooling pools at some plants are potentially at risk from a terrorist attack, given existing plant security measures, the likelihood that terrorists could steal enough spent fuel to use in a nuclear dispersal device is small.
- Most significant threat from a terrorist attack is the potential for breaching the cooling pools themselves because an attack that partially or completely drains a cooling pool could initiate a high-temperature fire in the fuel’s zirconium cladding.
- Recommendations include:
 - Repositioning fuel rods in the pools to more evenly distribute heat loads from radioactive decay.
 - Installing water-spray systems to cool the fuel in the event of a coolant loss.
 - Having US Nuclear Regulatory Commission “promptly undertake plant-by-plant vulnerability analyses to determine which plants are at highest risk.”
 - Having US Nuclear Regulatory Commission improve the sharing of pertinent information from its analyses with nuclear power plant operators and commercial vendors.

[See <http://www.nap.edu/books/0309096472/html/>]

➤ Examining the Science of Oil Spill Dispersants

In 1989, the National Research Council recommended that chemical dispersants be considered as a first response option to oil spills. Continued difficulty in quickly mobilizing oil dispersal prompted the US Coast

Guard recently to require that more equipment and personnel be on hand to apply dispersants to spills in a timely manner. The use of dispersants is generally approved for spills at least five kilometers from shore and in water at least 10 meters deep, where dispersed oil’s impact on marine life is likely to be low. But now that dispersal equipment will be more readily available, officials want to know whether these agents should be used in nearshore, shallow waters, where most oil spills in the United States occur. The Research Council was again called upon to examine the current state of science surrounding the use of dispersants as a response to oil spills, particularly nearshore ones. Its report found:

- That dispersants must be used within 12 to 48 hours after a spill, before fluctuations in water temperature change the oil’s viscosity.
- That the decision to use dispersants is a trade-off between decreasing the risk to organisms that thrive on the water’s surface and coastline, and possible increased risk to fish populations, sea grasses and coral reefs, and creatures that live on the seafloor.
- That federal and state agencies, along with industry and international partners, should establish an integrated research plan focused on experiments to support decisions about when and where to use dispersants.

[See <http://www.nap.edu/books/030909562X/html/>]

HEALTH

➤ Guidelines for Stem Cell Research

A new report from the National Academies provides guidelines for research involving human embryonic stem cells, and says that a standard set of requirements for obtaining, storing, distributing, and using embryonic stem cell lines, one embraced by the entire US scientific community, is the most responsible means to achieve advances in this area. Previously, the National Academies have recommended that both adult and embryonic stem cell research go forward, including research using a lab technique called nuclear transfer to derive stem cells, but that human reproductive cloning should not be attempted. The report:

- Finds that the scientific community needs guidelines to ensure that the work is conducted responsibly.
- Offers guidelines for monitoring scientific investigations involving human embryonic stem cells at institutions conducting such work.
- Urges that practices for obtaining donated eggs, sperm, or blastocysts meet the highest ethical and scientific standards.
- Offers guidelines for use of animal embryonic stem cells, including nonhuman primates.
- Recommends creation of an independent body to periodically review the guidelines.

[<http://www.nap.edu/books/0309096537/html/>]

Our Thanks to Academy Sponsors

The Academy wishes to express its sincere thanks to all of its sponsors, whose support makes the important work of the Academy, including this publication, possible.

◆ Leading Patrons ◆

The Connecticut Light and Power Company • Pfizer

Visit our web site at www.ctcase.org

DEEP RIVER, CT 06417
PERMIT 155
US POSTAGE PAID
PRESRT STD

NEWS in Science and Technology
CONNECTICUT ACADEMY OF SCIENCE AND ENGINEERING
179 Allyn Street
Hartford, Connecticut 06103-1422