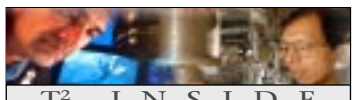
FLC NEWSLINK

A Publication of the Federal Laboratory Consortium for Technology Transfer

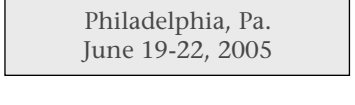
October/November 2004



T² INSIDE

T² FACT

The Iron Age, 1200-550 B.C.E, received its name due to the increased use of iron in advancing technology during that period. Eventually, the addition of carbon to iron led to the production of steel which contributed to the development of stronger dishes, catapults, body armor, mining pumps, the construction of large aqueducts used for transferring water for hundreds of miles, and sewer systems.



T² EVENTS

Mid-Atlantic Technology Conference and Expo
Baltimore, Md.
Dec. 1-2, 2004

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Society of Automotive Engineers
Troy, Mich.
Dec. 9-10, 2004

•

Western Conference and Exposition 2005
San Diego, Calif.
Feb. 1-3, 2005

•

National Design Engineering Show
Chicago, Ill.
March 7-10, 2005

•

World's Best Technologies 2005
Arlington, Texas
March 28-30, 2005

•

FLC National Meeting
Mission Driven Partnerships
Orlando, Fla.
May 1-6, 2005

•

NSTI Nanotech Conference and Trade Show
Anaheim, Calif.
May 8-12, 2005

•

Bio 2005
Philadelphia, Pa.
June 19-22, 2005

Brookhaven Researchers Work to Stop Infection

by Karen McNulty Walsh, BNL

Scientists at the U.S. Department of Energy's **Brookhaven National Laboratory** (BNL) and the Albert Einstein College of Medicine have produced the first molecular-scale images of DNA binding to an adenovirus enzyme — a step they believe is essential for the virus to cause infection.

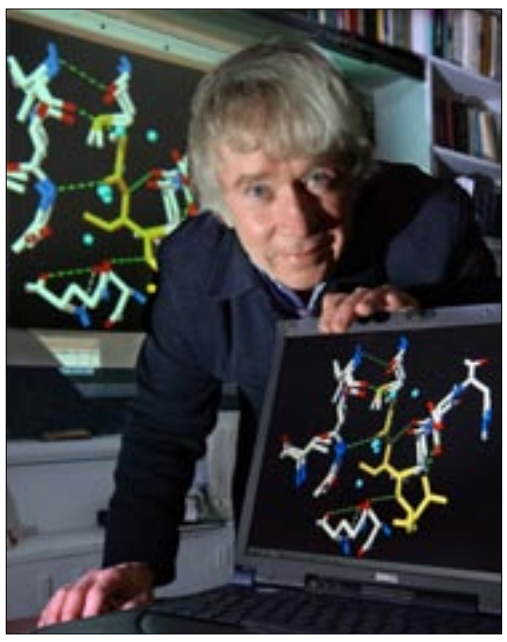
The images, which appear on the cover of the October 2004 issue of *Molecular and Cellular Proteomics*, show how binding to DNA may stimulate the enzyme and are already being used to design new antiviral drugs to block this interaction.

"We were quite surprised to see that DNA actually stimulated the activity of the enzyme," said BNL biologist Walter Mangel, a co-author of the paper. "If we can block this interaction, we should be able to prevent the virus from replicating, and thereby thwart infection."

Adenoviruses cause respiratory, gastrointestinal, and eye infections, including highly contagious viral pink eye. Some adenovirus eye infections lead to blindness. Respiratory epidemics of adenovirus are often prevalent on army bases.

In patients with compromised immune systems, such as those infected with human immunodeficiency virus (HIV), an opportunistic adenovirus infection can be deadly.

During infection, adenovirus makes an enzyme called a protease, which cleaves or degrades viral "scaffolding" proteins to complete the maturation of newly synthesized virus particles. Mangel and others have been working to understand all the steps necessary for this enzyme's function, looking for new ways to stop its action and therefore block an adenovirus infection (www.bnl.gov/discover/Spring_04/anti_viral_1.asp).



BNL researcher Walter Mangel

The scientists didn't expect the viral DNA to bind to the protease, but they figured they should look just to rule out such an interaction. "It was something we had to do, to make sure they did not interact," Mangel said. The discovery that the viral DNA interacts with the protease was unprecedented and led them to characterize the interaction in detail. The scientists now believe that inside the virus particle the protease uses the DNA as a guide wire, sliding along the genetic material to remove the internal

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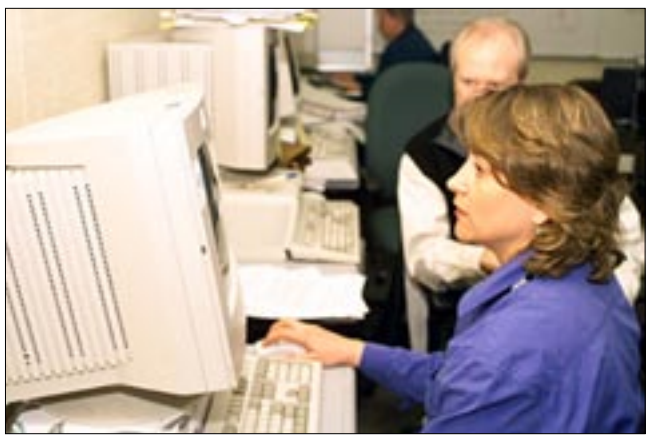
e-Tools for Technology Transfer Forum Benefit FLC

Access to Federal Laboratories' Royalty-free Software is Just a Click Away



The e-Tools Forum supplies federal laboratory members with cost-effective decision-making tools to meet their technology transfer missions.

The Department of Energy's (DOE) **Idaho National Engineering and Environmental Laboratory** (INEEL) is coordinating a cooperative interlaboratory initiative called the e-Tools for Technology Transfer Forum.

The initiative allows participating federal laboratories to share electronic tools and lessons learned related to technology transfer and intellectual property management.

The overall goal of the e-Tools Forum is to supply members with cost-effective decision-making tools to meet their technology transfer mission. The e-Tools Forum is available to all federal laboratories that decide to participate. Information technology is used throughout federal laboratory systems to manage intellectual property and facilitate technology transfer. Some of these technologies are purchased from commercial vendors, while others are custom applications developed and used by individual laboratories. These tools are not standard and can be difficult to evaluate and implement. Currently, a software-sharing system for laboratories doesn't exist. The e-Tools for Technology Transfer Forum will offer members a system that is easy to identify, access and share software and experiences.

The e-Tools Forum will be designed to benefit both software users and code contributors. When a user enters the secure system, software upgrades and downloads will be available. Also, a user will be able to communicate online with other laboratories to learn about their past experiences with specific software, implementa-

See e-Tools for T², page 4

DC on T²

Government Plans Future of Science and Technology

by Dave Appler
FLC Washington, DC Representative

Dave Appler

Wondering what the federal government's priorities for science and technology (S&T) are for the next four years?

I've had the chance to review several documents and take in several presentations that shed some light on this topic.

First, let me outline the S&T agenda of both presidential candidates, Senator John Kerry (D-Mass.) and President George W. Bush. Senator Kerry's technology plan is outlined under five key points. They are:

1. Create a business environment that

See DC on T², page 5

Global Hawk UAV Takes Flight

from the Office of Naval Research

On October 6, the first RQ-4A Global Hawk unmanned aerial vehicle (UAV) slated for the Navy's Global Hawk Maritime Demonstration (GHMD) program made its first flight from Palmdale, Calif., to Edwards Air Force Base, Calif.

Designated N-1, the first Global Hawk unmanned aerial vehicle (UAV) slated for the Navy's Global Hawk Maritime Demonstration (GHMD) program, took flight for the first time on Oct. 6, 2004.

The mission lasted approximately four hours and exercised the airframe, guidance system, and power plant.

This is the first of two RQ-4A aircraft the Navy is acquiring as part of the GHMD program. This program is intended to develop maritime UAV tactics and operating procedures. Lessons learned from GHMD will be applied to future naval UAV systems. The system will provide the Navy with an enduring testbed to evaluate

See Navy's Global Hawk, page 4

Fed Labs Flash

Technology Transfer Notes

West Virginia Tech Group Wins FLC Industry Award

Front row: Devanna Corley, Jason Cunningham, Dorothy Vincent, Program Specialist for the Office of Naval Research, Cynthia Gonsalves, Industrial Specialist for the Department of Defense, Mark Wendell, Brad DeRoos. Back row: Chris Vance, Scott Hofer, Jay Conaway, Josh Morrison.

The West Virginia High Technology Consortium (WVHTC) Foundation has received the FLC Mid-Atlantic Regional Industry Award. The prestigious award recognizes WVHTC Foundation's development of Navy TechMatch, which has made significant contributions to the federal technology transfer program.

Navy TechMatch is an intuitive, automated, easy-to-use Internet tool that provides academia, industry and government with solutions to their challenging "real-world" technical problems.

The award was presented at a luncheon held September 16 as part of the annual FLC Mid-Atlantic Regional Meeting at Rocky Gap Resort near Cumberland, Md.

Bradley DeRoos, WVHTC Foundation's Director for Technology Research, stated that the web site helps industry quickly and efficiently find information on the government's technology needs and research and development opportunities. "The system will be a great resource to any West Virginia business interested in working with the Department of Defense."

The site has already proved to be an invaluable asset to Navy T^2 managers who can now quickly provide industry with information on their patent holdings. Ultimately, the goal of Navy TechMatch is to put defense-developed technologies into the hands of U.S. business owners, who can then commercialize and profit from those innovations.

The development team, composed of Jason Cunningham, Mark Wendell, Jay Conaway, Scott Hofer, Devanna Corley, Josh Morrison and Chris Vance, designed a system that significantly enhances and alerts government labs and industry of technology needs and R&D opportunities identified by the U.S. Navy.

James L. Estep, WVHTC Foundation President and CEO, stated, "I'm very proud of our development team. This award helps validate what we have always known, that we have a world-class staff."

Over 200 users are currently registered with this free service, which allows them to choose keywords in their particular areas of interest and receive e-mail notifications of technology needs, opportunities, licensable patents, and calendar events.

To view the site and become a registered user, visit <www.navytechmatch.com>.

The WVHTC Foundation is a 501(c)(3) non-profit organization based in Fairmont, W. Va., that functions as an engine of economic change for growing a statewide and regional high tech business sector.

More info: Devanna Corley, Outreach Coordinator for Navy TechMatch, 304-366-2577, ext. 234

PPPL Awards $12M for Fusion

Nathaniel Fisch, a Princeton University professor and a scientist at the U.S. Department of Energy's **Princeton Plasma Physics Laboratory** (PPPL), is among seven winners of the 2004 E.O. Lawrence Award. Each winner receives a gold medal, a citation, and $50,000.

The award is given for outstanding contributions in the field of atomic energy, broadly defined.

"We are all enriched by the contributions these researchers have made, ranging from engines with no moving parts to better ways to see the stars," said Energy Secretary Spencer Abraham. "These awards, and the research for which they are given, show that DOE could easily be called the Department of Science and Energy."

PPPL's Nathaniel Fisch

Fisch is receiving the award in the nuclear technology category for his discovery of ways to use plasma to produce electric cur- a hot, ionized gas that serves as the fuel for nuclear fusion.

These wave-induced currents can enable fusion reactors, called tokamaks, to operate continuously, which is necessary for an economical and practical fusion reactor.

Tissue Preservation Patent

Body tissues such as blood vessels, cartilage and skin—even whole organs such as kidneys, livers and hearts—could become more widely available for transplants as a result of a patent issued recently to Organ Recovery Systems of Chicago for a method to chill body tissues and organs well below freezing without forming ice crystals.

The new process for tissue "vitrification"—chilling tissue and organs to a disordered, glass-like solid without ice formation—was developed with support from the **National Institute of Standards and Technology** (NIST) Advanced Technology Program and the National Institutes of Health.

There is an urgent need for tissues and organs for transplantation. Doctors conducted over 24,000 organ transplants in the United States in 2002; yet someone is added to the donor waiting list every 12 minutes, and 16 people die each day waiting for an organ transplant.

A significant roadblock to the broader use of transplantation, regardless of the source, has been preserving the transplant tissue. This new process is a big part of a much-needed solution to this problem.

President Forecasts Greatness for Berkeley's Torn

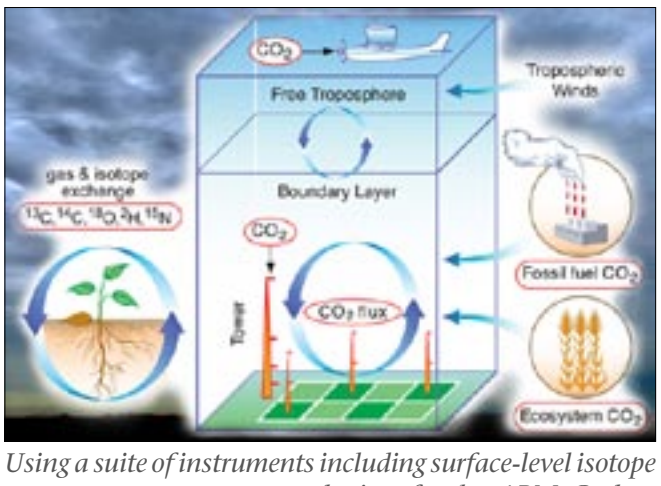
by Paul Press, Lawrence Berkeley National Laboratory

Margaret Torn

In a White House ceremony held Thursday, September 9, 2004 in the nation's capital, **Margaret Torn**, a scientist with the Earth Sciences Division of the Department of Energy's **Lawrence Berkeley National Laboratory** (LBNL), received a 2003 Presidential Early Career Award for Scientists and Engineers. The awards were presented by John Marburger, director of the Office of Science and Technology Policy.

Torn, a biogeochemist, was honored for her innovative research on climate change and the terrestrial carbon cycle. She is one of four researchers from DOE's Office of Science and three from the Office of Defense Programs to receive this year's award, among a total of 57 recipients from eight government agencies. The award is given annually to honor and support the extraordinary achievements of young professionals at the outset of their independent research careers.

"The work of these young scientists and engineers is an excellent example of the kind of innovative and forward-looking research that our nation needs to meet the challenges of the 21st century," said Energy Secretary Spencer Abraham. "Their work will help to contribute to our energy security and independence far into the future."



Using a suite of instruments including surface-level isotope measurements, towers, and aircraft, the ARM Carbon Project seeks to understand how land use and climate are linked to carbon, water, and energy exchanges.

"Margaret brings distinction to Berkeley Lab and to its program in climate change and carbon management," said Laboratory Director Steve Chu. "The work of her and her colleagues will be critical as the world confronts the challenges of developing a carbon-neutral, sustainable energy economy in the coming years. In addition, one of the questions she is addressing — the role of feedback mechanisms — lies at the heart of how we can accurately predict climate change."

Of her research, Torn says, "Most important, I and my colleagues are working to characterize the feedbacks between climate change and ecosystems — as sources and sinks of greenhouse gases and how the surface of the land affects things like albedo," the degree to which solar radiation is reflected. "These are key factors in radiative forcing, the basis of global warming."

Torn heads the Carbon Project for DOE's Atmospheric Radiation Measurement (ARM) Program, a team of eight scientists plus support staff based at LBNL who gather data at ARM's Southern Great Plains site in Oklahoma. Equipped with an instrument suite designed by Torn, this location has been called "possibly the best-instrumented site for regional carbon studies in the world." The resulting data, bridging scales from individual crops to the middle of the continent and from the ground surface to the stratosphere, have led to improvements in regional and global computer climate models.

More info: visit www.lbl.gov.

FLC NewsLink

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Tech Watch: *Laboratory Techs Ready for Transfer*

ECBC's Durst Leads Nano Research for Biodefense, Medicine

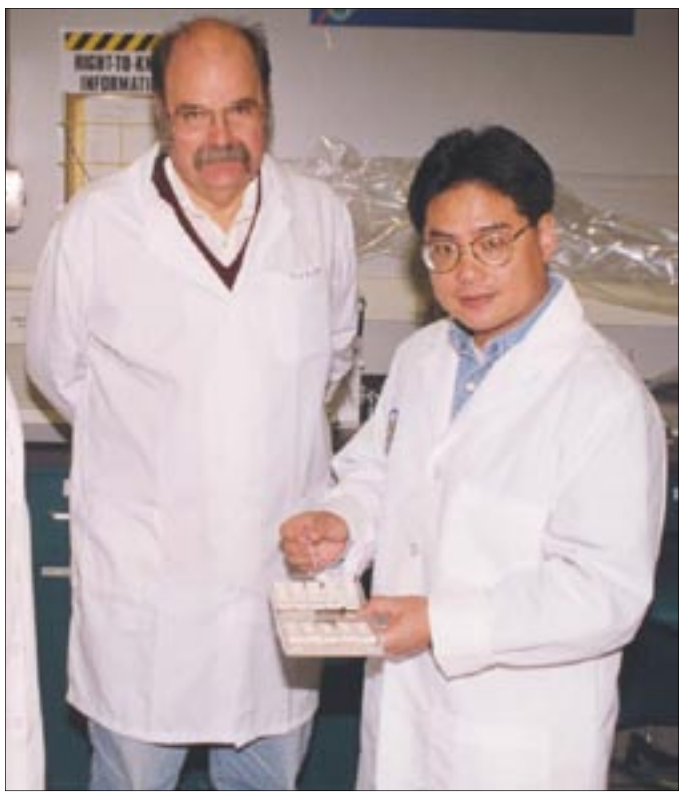
Collaboration between Army scientists at the **Army Research Laboratory** (ARL) and the **Edgewood Chemical Biological Center** (ECBC) has produced a pair of valuable patents in the booming field of nanotechnology.

The new patent for "Enhancing Protein Activity Through Nanoencapsulation" (Patent No. US 6,716,450 B1) describes a method of encapsulating enzymes and other proteins in a way that maintains the bioactivity of the molecules even at extreme temperatures and harsh pH levels.

The invention of these polymer nanocapsules to both protect and enhance the reactivity of such proteins has a wide range of potential applications in biodefense, as well as medical applications such as drug delivery.

The inventors, led by **H. Dupont Durst** at ECBC and **Ray Yin**, formerly of ARL, not only describe a way to protect enzymes and proteins from inactivation under harsh conditions, but also a method of using nanocapsules as controlled-release agents or carriers for drug, protein and vaccine delivery.

Protein/enzyme stabilization is critical to a variety of applications, including medical diagnostics, bioremediation, environmental cleanup, biocatalysis, and protein delivery.



H. Dupont Durst of ECBC and Ray Yin, formerly of ARL, are advancing nanotechnology for biodefense and medicine.

Drs. Durst and Yin also led the team whose invention is described in "Compositions and Methods for Enhancing Bioassay Performance" (Patent No. US 6,773,938), a novel nanomanipulation approach to constructing miniaturized nano-biodetectors with superior assay performance.

The technology disclosed in the patent, which was issued on August 10, 2004, has a range of applications, including medical diagnostics, high-throughput drug/gene screenings, environmental monitoring, chemical and biological defense, and domestic preparedness programs, all of which would benefit from the development of miniaturized chem/biosensors and improved bioassays that are more sensitive, accurate, and reproducible, with virtually no false positive or false negative responses. In addition, this invention also reduces the amount of reagent used in the immunoassays, thus reducing production and operating costs.

ECBC Technical Director **Joseph H. Zarzycki** and **John M. Miller**, Director of ARL, have signed a Memorandum of Understanding to jointly market and license these technologies to one or more industry partners for commercialization. These patents are examples of the many technologies available for licensing and cooperative research and development from the Aberdeen Proving Ground.

More info: Mike Rausa, 410-278-5028, mrausa@arl.army.mil

NREL for Hydrogen

The **National Renewable Energy Laboratory** (NREL) has developed a fiber-optic hydrogen gas detector that has applications in hydrogen fuel technologies and industries that use or produce hydrogen, such as petrochemical, transportation, and fuel cell applications.

It is inexpensive, generates results quickly, and correlates with measurements taken with standard gas chromatography.

The sensor can also be used to measure weld integrity. A patent (5,708,735, 1998) and several pending patents cover the sensor and the reactive thin films (a nondisclosure agreement will be required to view the pending patents).

NREL is looking for a strategic alliance to develop and commercialize this technology.The alliance could be a license, a Cooperative Research and Development Agreement (CRADA), or a Work for Others (WFO).

If you are interested in licensing this technology or exploring collaborative research to further develop this technology, contact Richard Bolin, 303-275-3028, Richard_bolin@nrel.gov

Cancer-Fighting CRADA?

The **National Cancer Institute** (NCI) is currently seeking CRADA collaborator(s) to work with investigators in the Center for Cancer Research (CCR) to explore, for drug development and clinical testing, novel antiangiogenic agents that target adrenomedullin gene products.

Research and development may include development of blocking reagents (humanized antibodies, peptide antagonists, small molecules), formulation for systemic and topical application, preclinical animal studies, and clinical trials.

Licensing is available for background inventions related to this technology.

Parties interested in a CRADA collaboration should notify the Technology Transfer Branch of the NCI in writing of their interest.

Licensing inquiries/applications are accepted by the NIH Office of Technology Transfer at any time.

For more information on the CRADA opportunity, contact Julianne Chappell, Technology Transfer Specialist, 301-496-0477, or jchappel@mail.nih.gov.

For general information, contact Pradeep Ghosh, Technology Transfer Specialist, 301-435-5282, ghoshpr@mail.nih.gov

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tion, vendors, etc. The idea is that member laboratories will provide feedback to the code contributors and help fund maintenance, support and improvements as needed to software that they download. This in turn will benefit code contributors, who can then share the cost of maintaining useful software and easily obtain feedback from outside users of their software.

With the basic idea of the forum now in place, steps will continue to be taken to move the project forward.

The initial DOE lab discussion occurred in October 2003, where the idea of creating a way for multiple labs to easily interact on software was generated. In May 2004, at the FLC annual meeting, the idea was presented to other federal laboratories to provide awareness and an opportunity to participate. Twenty-one federal laboratories and agencies met via a video/teleconference in July 2004 to talk about the charter and direction of the e-Tools Forum, a recommendation was made to take the idea to the FLC Executive Board and seek FLC assistance in raising awareness among federal labs.

The e-Tools Forum gained advocacy from the FLC Executive Board in August and was presented at the Mid-Continent/Far West Regional Meeting in September. An executive committee being formed to provide general guidance currently includes **Gary Wheeler** of **Walter Reed Army Institute of Research**, **Craig Smith** of **Sandia National Laboratories**, and **Charity Follett** of INEEL. The next step is to create a master agreement for collaboration. The agreement is intended for all participating laboratories and will cover how the e-Tools Forum will work, how funding will be contributed and used, and other common terms and conditions.

The agreement will be the mechanism for contributing the funding needed to create and maintain a permanent web site. The infrastructure of the forum will be developed once the funding is available. A temporary web site at <www.inel.gov/techtransfer/etools> includes more information on the e-Tools Forum and offers laboratories the opportunity to make comments or suggestions.

More info: Charity Follet, INEEL, 208-526-9353, follca@inel.gov

FLC T² Training Resources, Part 3

(cont. from the September issue)

We have also identified important regional trends in the availability of training resources that have developed along regional lines as defined by the FLC. The Mid-Atlantic Region, for example, accounts for 51% of all technology transfer training resources provided by federal sources in the T² TRDB. The Midwest Region provides 28% of the federally provided technology transfer training, with the Mid-Continent Region providing 13%. However, the Mid-Continent Region, where we identified the largest number of academically provided T² resources, accounts for 42% of all available training resources, with the Mid-Atlantic Region close behind with 35%.

Levels of Training

We identified three levels of T² training resources—fundamental, intermediate, and advanced. The best sources for training in advanced subjects are universities and colleges, which provide 62% of all advanced resources. Potentially, this reflects the experience and relative comfort within the academic community for conveying complex subject matter. It could also mirror recent growth in the number of technology transfer and commercialization courses and degree programs offered by academic institutions. It should be noted that while the recent technology commercialization-related degree programs have more of an industry slant, they are still rich in useful information. Conversely, the place for technology transfer fundamentals training is within the federal laboratory community, which accounts for 70% of all T² fundamental training resources. These resources are usually facilitated by other federal technology transfer professionals, thus ensuring heightened sensitivity to issues unique to the federal sector. Moreover, over 92% of the federal technology transfer training resources are free to federal employees.

Methods of Delivery and Instructional Format

Our research identified a wide range of instructional methods, including online (i.e., distance learning or computer-based), classroom onsite, classroom offsite, and mixed modes of instruction that combine classroom and online or computer-based training. Colleges and universities appear to be the best places to find dynamic online technology transfer training. While the federal community has a greater number of online resources available, a significant portion of those resources are simple read-only

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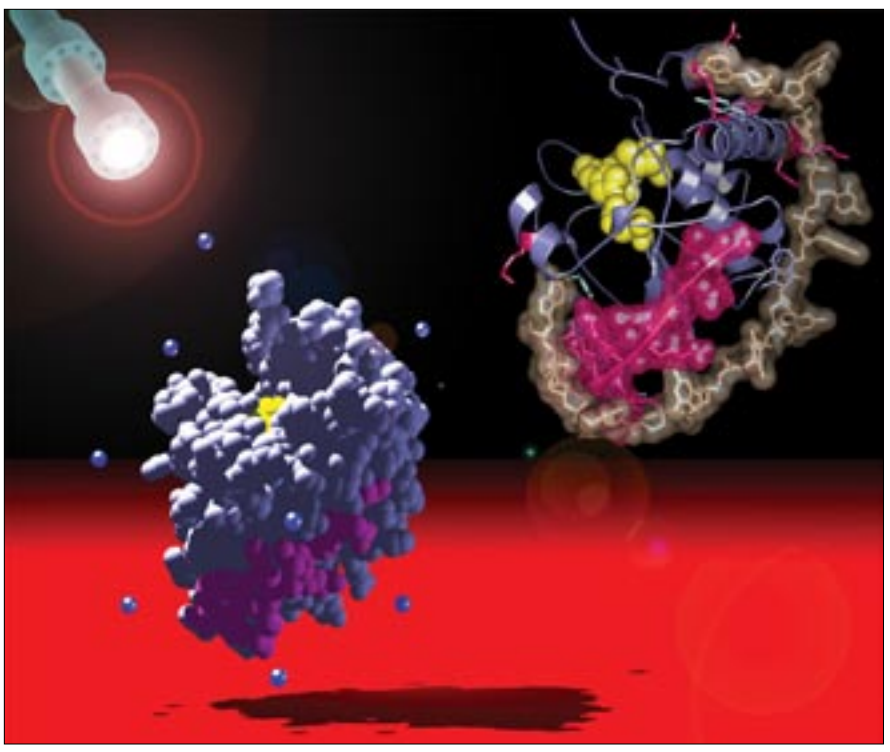

Two views of the adenovirus protease, an enzyme required for viral replication. DNA, depicted by the white "sticks," is shown binding to the enzyme on the right. Drugs that prevent the DNA from binding should prevent the virus from replicating and stop an infection.

"scaffolding" proteins, all located near the DNA. The team used a technique called synchrotron footprinting, which was pioneered by paper co-author Mark Chance and his colleagues at the Albert Einstein College of Medicine, to show where DNA binds on the adenovirus protease.

"Synchrotron footprinting is a technique recently developed at Einstein that allows structural information on the contacting surfaces of biological molecules to be precisely mapped.

"These contact points are regions providing critical communication in the cell," Chance explained. "In this study the footprinting approach provided information on the DNA binding region of the adenovirus protease that has not been solved by other techniques and can be used in drug design."

At the National Synchrotron Light Source — a BNL facility that produces extremely bright beams of x-ray, infrared, and ultraviolet light — Einstein's Sayan Gupta, the study's lead author, bombarded different solutions of the adenovirus protease and DNA with x-rays and characterized the changes that occurred on the surface of the protein. With this technique, the team was able to deduce the location of the DNA binding site based on the changes in accessible surface area.

"There is extensive contact between the enzyme and the DNA," Gupta said. "The DNA wraps around more than half the enzyme molecule. It appears like a strap, holding two parts of the protease together."

Since the DNA binding site is quite long, there are numerous locations along it that could be used as targets for drugs to block the interaction and act as antiviral agents, Mangel said.

The scientists have already begun looking for such drugs and hope to have the National Institutes of Health test some of them for antiviral activity within a year.

This work was funded by the Office of Biological and Environmental Research within the U.S. Department of Energy's Office of Science, the Biotechnology Resource Centers Program of the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health, and by the National Institute of Allergy and Infectious Diseases of the National Institutes of Health.

More info: Karen McNulty Walsh, (631) 344-8350, kmcnulty@bnl.gov

Navy's Global Hawk, from page 1

new technologies, support fleet experiments and exercises, and provide a contingency operational capability to support deployed Navy and Marine Corps forces.

"This flight marks an important step for the Navy's unmanned air vehicle programs and naval aviation," said Capt. Dennis Sorensen, Navy UAV program manager. "For the first time, the Navy will have an unmanned system that can support the fleet from nearly anywhere it operates.

"The lessons to be learned from this program will benchmark future intelligence, surveillance, and reconnaissance practices for the maritime environment. Congratulations to the Navy, Air Force, and Northrop Grumman contractor team for a job well done."

The basic RQ-4A Global Hawk UAV, manufactured for the U.S. Air Force by Northrop Grumman, is the largest and most advanced UAV in the American military. The Global Hawk is 44 feet long, has a 116-foot wingspan, and weighs 25,600 lb. Operating altitudes are in excess of 60,000 feet, and endurance is in excess of 30 hours.

The Navy Global Hawks are designed with features specifically tailored to maritime missions, including new radar modes for detecting and identifying ships at sea, as well as passive sensors capable of picking up hostile radars.

The ground stations are also modified, adding displays and controls needed to allow operators to analyze sensor information in real time and without external assistance. The GHMD system will be operated and maintained at NAS Patuxent River, Md., with the first delivery scheduled for the summer of 2005.

Although based at Patuxent River, the system will be moved/deployed to other locations.

More info: www.navair.navy.mil

Inside the FLC

FLC Technology Locator

Personalized 1:1 Assistance!

Need assistance locating information on federal technologies, federal laboratory expertise, or collaboration possibilities? Contact the FLC Technology Locator for personalized 1:1 assistance!

Call Sam Samuelian
856-667-7727

FLC Mid-Atlantic Region Shares T² Knowledge

About 100 government, university and industry experts met in Cumberland, Md., September 14-16, 2004, to share their knowledge of processes and experiences in licensing, transferring, and commercializing technology during the 2004 FLC Mid-Atlantic regional meeting.

Session topics included the roles of intermediaries, foreign licensing, communities of interest, metrics, university techniques, and marketing from organizations such as the National Institutes of Health, USDA, Army, Navy, Department of Commerce, National Security Agency, NASA, University of West Virginia, University of Buffalo, Gallaudet University, and Drexel University.

"This event was one of the best learning and networking experiences for professional technology transfer and licensing agents that the Region has ever held," said **Dr. Scott Deiter**, FLC Mid-Atlantic Regional Coordinator and T² specialist for the Indian Head Division of the **Naval Surface Warfare Center**.

Dan Pitkin of the National Institute of Science and Technology discusses the Manufacturing Extension Program and technology commercialization during the FLC Mid-Atlantic regional meeting.

The region also presented five of its annual Awards for Excellence in Technology Transfer, as well as Regional Laboratory, Appreciation, and Industry awards. In addition, **Dr. Charles Schlagel** from the **Naval Medical Research Center** received the 2004 Department of Defense George Linsteadt Technology Transfer Achievement Award. Dr. Schlagel was selected for his innovative, proactive approach to licensing the technology for The Hearing Pill™ to American BioHealth Group. The Hearing Pill can prevent or reverse noise-induced hearing loss and has been provided to our front-line forces during Operation Iraqi Freedom.

The agenda and presentation slides are available at the FLC web site, www.federallabs.org.

More Info: John Eichelberger, FLC Mid-Atlantic Region, 407-947-6443, iclserv@aol.com.

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will enhance America's competitiveness by eliminating capital gains taxes for long-term investments in small businesses, extending the research and experimentation tax credit, and adequately resourcing the Patent and Trademark Office.

2. Create high-tech/high wage jobs with a national strategy for universal broadband through tax incentives and by moving TV transmission from analog to digital faster to free up band width.

3. Invest in research for industries of the future by increased funding in nanotechnology, manufacturing (through NIST MEP and ATP programs), information technology, life sciences, clean energy, and "green" technologies. Also do more high-risk, long-term research, especially in the DOD, and use prizes to stimulate innovation.

4. Build a high-tech workforce with more investment in K-12 math and science, reward colleges for increasing science and engineering degrees, and create new learning technologies.

5. Build an information society by promoting digital opportunities to underserved communities, promoting e-government, and transforming health care through information technology investments.

President Bush's technology plan includes more details because they are reflected in the plans and budgets of various federal agencies, as well as some longer term visionary technology objectives that he has outlined in several speeches.

They include:

1. In energy R&D, investment in biofuels, alternative fuel technology, renewable energy R&D to support production cost reduction, power grid R&D, new nuclear energy R&D, and the long-term objective of hydrogen fuel cell technology.

2. Developing and establishing nationwide, fully electronic, protected, readily accessible personal medical records. At NIH, increased emphasis on biodefense and "smart" networks that can connect technologies such as bio, nano, and neuroscience.

3. Continued shift to more incremental R&D in the DOD and increased emphasis on special operations and terrorist response capabilities.

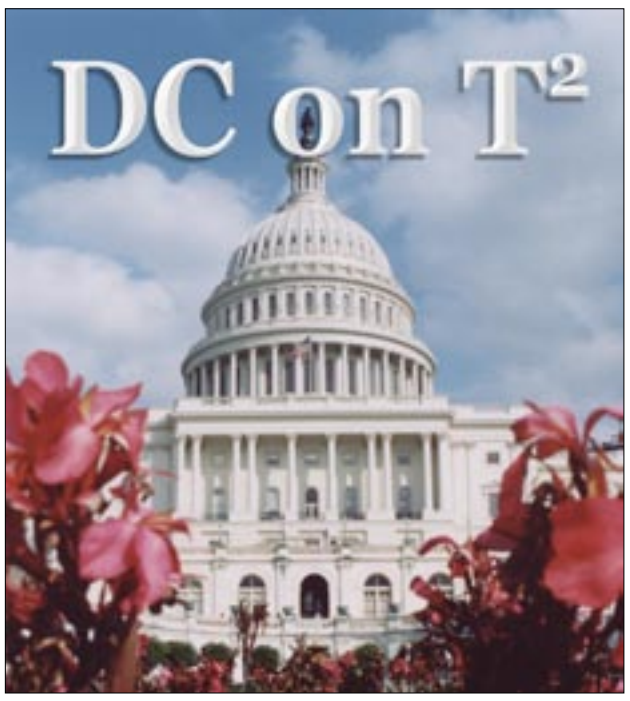
4. At NSF, continued emphasis on math and physical sciences, leading the multi-agency investment in nanotechnology, and construction of the National Ecological Observation Network and the new scientific ocean drilling vessel.

5. Accelerating deployment of broadband and freeing up TV broadcast spectrum usage (in the switch from analog to digital) to enable nationwide wireless broadband by 2007.

6. New and upgraded labs at NIST and an emphasis on manufacturing R&D.

7. Robotic exploration of the moon by 2020, new Mars exploration, and replacing the Space Shuttle fleet.

8. Continued significant increase in Homeland Security R&D, with a focus on countering chemical, biological, radiological, and other catastrophic events. Multi-year investment in the biosurveillance initiative to monitor human health, food, agriculture, and the environment. Initiatives to protect commercial airplanes and port facilities.



In a related area, the President's Science Advisor and the Budget Director issued a joint R&D program guidance memo to federal agencies regarding the preparation of their proposed FY2006 budget requests.

Under general guidance, it states that new program starts have to be offset by other program reductions or eliminations (i.e., no R&D budget growth in most agencies). In addition, it states that the "Administration favors federal R&D" that:

1. Enables high payoff activities where a federal presence can help attain national goals such as national security and energy independence
2. Maintains R&D infrastructure
3. Enhances health
4. Strengthens science, math and engineering education
5. Supports innovation that enhances economic competitiveness (i.e., technology transfer)
6. Promotes understanding of the global environment
7. Supports a technically viable workforce
8. Strengthens international partnerships
9. Promotes an efficient and effective R&D program consistent with agency missions.

The remainder of the guidance memo highlights the following interagency R&D priorities (R&D priorities within agencies are left to the individual agency heads to establish):

1. Homeland Security. Focus on applied technologies that can prevent, detect, treat, remediate, and attribute acts of terrorism; design and development of secure infrastructures, establishing standards for homeland security-related technologies; new T&E capabilities for next-generation medical countermeasures; biosurveillance technologies; and new drugs and vaccines for foreign animal disease threats.

2. Networking and Information Technology. Focus on supercomputing R&D consistent with the interagency coordinated High-End Computing Revitalization Task Force, and on cyberinfrastructure hardware and software R&D that can strengthen connections between new and existing computers, databases, and scientific instruments.

3. National Nanotechnology Initiative. Emphasis on fundamental and applied R&D in nanotechnology, nanoscience, nanoscale instrumentation, and metrology with dissemination of new technical capabilities to industry. Interagency collaboration of human health and environmental issues is also highlighted.

4. Physical Sciences. Emphasis on high-temperature and organic superconductors, molecular electronics, wide band-gap and photonic materials, thin magnetic films, and quantum condensates. High priority given to developing and enhancing instruments and facilities from bench-top to large-scale facilities in order to reestablish a proper balance between R&D investment and the infrastructure needed for world-class R&D.

5. Biology of Complex Systems. Agencies were encouraged to target investments that help understand complex biological systems by integrating collaborations among physical, behavioral, social, and biological researchers that could produce new ways of collecting and analyzing data. Potential outcomes include breakthroughs in preventing and treating infectious diseases in plants, animals, and humans; and new approaches to dealing with obesity, environmental management, and the neural basis of behavior.

6. Climate, Water, and Hydrogen. Continued emphasis on global climate change research; R&D to support, monitor, and forecast U.S. and global supplies of fresh water; and continued long-term investment in the President's Hydrogen Fuel Initiative.

For more information on technology transfer legislation and policy, contact Dave at 703-414-5026 or dappler@flcdc.cnchost.com.

FLC T² Training Resources, from page 4

documents. Nevertheless, many of the online training resources available in academia require an admissions process prior to enrollment in the course.

On the other hand, federal laboratories offer many online training options that require little to no admission process. In addition, while specialized technology transfer organizations such as the FLC have begun developing online training, course offerings available through specialized T² organizations are still fairly few in number.

Although online delivery of T² training is becoming increasingly popular, the most popular method, regardless of provider type, is the classroom onsite method, with almost 60% of all identified resources delivered in this manner. A resource is classified as a classroom onsite method if 1) it is given in a physical location and 2) the location coincides with the provider's actual physical address.

If the training is given by a specific organization in a physical location different from the provider's physical address, the resource is classified as "classroom offsite." An example of this would be a course conducted by the FLC at a conference hotel.

However, approximately 60% of the training resources identified are offered in the "classroom onsite" form. This implies that a technology transfer professional is often limited by the scope of training resources available in his or her area.

Another dynamic to be considered when selecting T² training is instructional format as it relates to the types of providers.

Instructional formats include lecture, self-study with and without an instructor, mentor guidance, seminar, workshop, and mixed format.

Universities and colleges, for example, make the greatest use of the lecture format, providing 56% of all training done in the lecture format. By contrast, the majority of federal resources are self-study without an instructor. A typical example of that format is a training manual that is made available online to facilitate access.

While this is indeed a training resource, it fails to provide the same sort of fluidity found in more interactive forms of training. The popularity of the self-study without instructor format in the federal community is most likely due to the relative ease and cost efficiency associated with this type of instruction.

The Cost of T² Educational Resources

	$0	$1-100	$100-400	$400-1000	$1000 Plus	Total
Federal	77	0	1	0	3	81
T² Organizations	22	7	4	7	3	43
Academia	0	0	0	0	82	82
Other	0	0	1	2	1	4
Total	99	7	6	9	89	210

Similarly, the popularity of the lecture format within the academic setting is most likely due to academia's relative comfort with the lecture method.

The Cost of Training

Our research has identified several patterns related to the cost of available technology transfer training resources (see table above).

For example, the majority of academic courses cost over $1000. This is a significant barrier to the often tightly budgeted federal technology transfer professional.

Conversely, most free resources are housed within the federal community, possibly in response to the gradual tightening of federal budgets over previous years or to the heavy expense of academic technology transfer training resources. Nevertheless, the data show a clear preference within the federal community for less expensive training. Clearly, cost can be an effective means of identifying where the technology transfer professional may wish to focus a search for training resources.

Conclusion

In the end, the process of choosing where to find training will vary from individual to individual, with variables differing in importance among individuals.

When a T² professional is attempting to determine which training resource is best suited for his or her needs and situation, it is essential to use any and all resources available.

Talking to colleagues, searching the internet, contacting a local university, calling specialized technology transfer organizations like the FLC, and making use of the FLC's T² TRDB are all ways to ensure the selection of the best course for your requirements. (To access the T² TRDB, go to the FLC web site and click on the Education and Training icon).

The E&T Committee, chaired by Lynn Murray, will continue to explore the current T² training landscape in an effort to answer some of the questions raised by our research and to provide better service to FLC members.

Further analysis of our research will appear in future *FLC NewsLink* articles.

Kevin Permenter and Kelvin Willoughby of the FLC T² Training Resources Project and Steve Boardman of the Education and Training Committee contributed to this article. The Education and Training Committee is chaired by Lynn Murray of the Volpe National Transportation Systems Center. Lynn can be reached at <murrayl@volpe.dot.gov>.

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