

FLC NEWS LINK

January
2004

Federal Laboratory Consortium for Technology Transfer
The Only Government-wide Forum for Technology Transfer

T² Events

The O'Reilly Emerging
Technology Conference
San Diego, Calif.
Feb. 9-12, 2004

Technology Transfer
Conference and Expo
Chicago, Ill.
Feb. 23-26, 2004

Society of
Automotive Engineers
Detroit, Mich.
March 8-11, 2004

World's Best
Technology 2004
Arlington, Texas
March 21-23, 2004

FLC National Meeting
*Mission-Driven
Partnerships*
San Diego, Calif.
May 3-7, 2004

Bio 2004
San Francisco, Calif.
June 6-9, 2004

WorldFuture 2004
Creating the Future Now
Washington, D.C.
July 31-Aug. 2, 2004

Go to:
<www.federallabs.org>
for a complete
calendar of events

T² Fact

Conrad Hubert, a poor Russian immigrant to the U.S. in 1890, developed the first flashlight, which he coined the "electric hand torch." The idea was sparked by a friend of Hubert's who sold battery-operated lighted flower pots. The poor Russian immigrant died worth \$8 million.

Inside



Navy DNA Map
Saves Lives
Page 2



Brookhaven's
"Pure"
Hydrogen
Page 3



BioTech
Boosts Immune
System
Page 3

AFRL Transfers Tech to Future Scientists

Air Force Research Laboratory (AFRL) Sensors Directorate personnel are doing their part to encourage students to do well in math and science by donating computer systems to school districts and private parochial schools in Ohio.

Montgomery, Clark, Greene, Butler, Warren, Miami, Darke, and Preble county schools have received more than 150 pallets of computer components donated by AFRL.

"Every three years, each computer within the Sensors Directorate is replaced so our scientists and engineers can work on the most up-to-date



Our Lady of the Rosary computer lab teacher Mrs. Cindy Todd looks over the inner workings of a computer with students Mitchell E. Smith II and Victoria Lynn Smith.

equipment," said Grace Janiszewski, program coordinator.

The Pentium I and II computers being replaced are given to the school districts to enhance math and science instruction in the classrooms.

"The computer systems donated have allowed us to expand our technology classes," said Jack McIntosh, Northridge Local School District technology director. "They have also expanded the number of opportunities that we can offer students and increased the number of students served."

See Tech for Students, page 4

KC Plant Delivers Tech to Enhance Threat Reaction

Monitor, analyze and communicate real-time threat situations. That's what the Better Environment to Stop Terror (BEST) portable image recognition and analysis transducer equipment (PIRATE) accomplishes.

This unique hazard analysis and communication system was developed by associates at the National Nuclear Security Administration's **Kansas City Plant**.

The PIRATE, a compact, secure, and wireless communications platform and hazard analysis system provides standard computer interfaces for custom and commercial off-the-shelf sensors for threat investigation, secure encrypted communications, global positioning sensors, graphical user interface,



The Kansas City Police Department's robot carries the PIRATE device during a demonstration at the Kansas City Plant. A scenario was created for the demonstration where an individual was handcuffed to the steering wheel of a car and a suspicious package with a substance seeping from it was under the vehicle.

graphical interface, image recognition software, and a self-contained or remote power supply.

The system can be deployed in a stand-alone configuration where

hazards can be diagnosed on the spot, or placed in remote locations requiring the collected data to be transmitted to regional or national command centers for analysis.

PIRATE collects data through an image recording and analysis method, and transmits directly to the control unit. The control unit collects and analyzes the data, and communicates the information—via an encrypted, wireless network—to the open architecture transmission and supervision unit for local analysis. Local site personnel may then determine an appropriate course of action or may transmit the collected data via cellular or satellite telephone to a networked location anywhere in the world for further analysis.

This enhanced system is more accurate and user-friendly, and *See KC Delivers Threat Tech, page 4*

DC on T²

by **Dave Appler**
FLC Washington, DC Representative

The White House Office of Science and Technology Policy (OSTP) recently posted a report by the President's Council of Advisors on Science and Technology (PCAST) on the subject of technology transfer.

The full text of the 23-page report can be found on the FLC web site at <www.federallabs.org/legislation>.

In both the transmittal letter from the PCAST panel to the PCAST co-chairs, as well as in the PCAST co-chairs' letter to the president, several common but salient points were made. The current



Dave Appler

See DC on T², page 5

Lab in the Limelight: ARS Turns 50

by **Kim Kaplan**

The **Agricultural Research Service (ARS)**, the chief scientific research agency of the U.S. Department of Agriculture (USDA), marked its 50th anniversary in November.

ARS's accomplishments during the past half century include development of the leading mosquito repellent, development of vaccines to protect chickens against economically devastating diseases, creation of a key equation to reduce soil erosion, and the discovery of two new forms of life—viroids and spiroplasmas.

Viroids are strands of ribonucleic acid (RNA) that can cause disease in plants and crops; spiroplasmas, which also are responsible for many plant diseases, are lifeforms with no cell wall and one of the smallest genomes of any living organism.

Today, ARS is the largest agricultural science agency of its kind in the world, with more than 2,100 scientists conducting research at

See ARS Turns 50, page 4



From the farm to the table, ARS research is helping to better understand human nutrition—from determining what nutrients are in food to the optimum diet.

FED LABS FLASH

TECHNOLOGY TRANSFER NOTES FROM WITHIN THE FEDERAL LABORATORY COMMUNITY

NACE INDUCTS ALBANY RESEARCHER



Steve Cramer receives the NACE award.

Dr. Stephen D. Cramer, a chemical engineer at the Department of Energy's Albany Research Center in Albany, Oregon, was inducted as a Fellow in the National Association of Corrosion Engineers (NACE).

The NACE award is for distinguished contributions in the field of corrosion and its prevention. Dr. Cramer has 40 years of federal government experience working on corrosion and its effects on the U.S. transportation, energy, and environmental infrastructure. He has authored over 100 publications on atmospheric corrosion, bridge corrosion, geothermal and energy corrosion, cathodic protection, and failure analysis. He holds two patents on processes for improving the electrodeposition of metal coatings, and is currently editing the new edition of the *Corrosion Handbook* for ASM International with Bernard S. Covino, Jr., also at the Albany Research Center.

U.S. BIZ TO INCREASE FED RELATIONS

by Neil MacDonald
Technology Commercialization

U.S. companies might increase their R&D activities with federal laboratories and precompetitive university research

consortia in the coming year, according to the Industrial Research Institute's (IRI) R&D trends forecast for 2004.

Based on a survey of members performed this fall, the 20th annual IRI R&D trends forecast found indications that more companies intend to reduce rather than increase their R&D spending in the coming year.

"Reductions outnumber increases in capital spending, basic research, support of existing businesses, staffing, new-grad hiring, research intensity, and even outsourcing and licensing," IRI Research-on-Research Committee Chair Albert Johnson reported to a Dec. 15 seminar.

"Many companies transitioned from 'doing more with less' to 'doing less with less,'" noted Johnson, a senior analyst with Corning, Inc.

An international perspective is also offered that suggests, measured by R&D intensity (R&D spent as a percentage of sales), that foreign firms may be outspending U.S. companies.

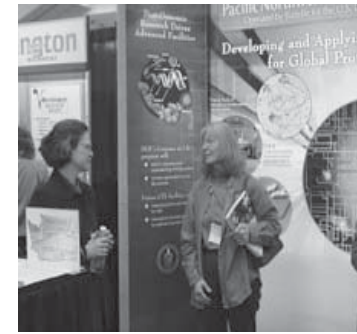
For example, Japanese firms trading on U.S. stock exchanges have about one-tenth of the net sales of their U.S. counterparts, but spend over 4% of each sales dollar on R&D, compared with the 1.7% spent by U.S. firms.

"This might have strategic implications for U.S. companies on global markets," Johnson believes, "because even though U.S. companies lead the world in innovation, if present trends continue, this soon will not be true.

"They are outspent and, as non-U.S. economies develop and mature, the U.S. companies will likely be outsold."

PNNL A BIG NAME IN CELL BIO

Researchers from Pacific Northwest National Laboratory (PNNL) participated in the 43rd annual meeting of the American Society for Cell Biology (ASCB), December 13-17 in San Francisco.



ASCB annual meeting attendees visit PNNL's exhibit.

The event, which typically draws thousands of attendees, seeks to promote the primary objective of the ASCB, which is to cultivate the

exchange of scientific information in the area of cell biology. The Society also works to ensure the future of basic scientific research and communicates the importance of biomedical research to Congress and the general public.

In addition to hosting a booth at the conference's trade show, PNNL's involvement included Steven Wiley, who co-chaired a symposium, "Biomolecular Networks in Cell Biology."

The symposium covered some of the new technologies that are being used to elucidate the structure and function of cellular networks, including gene and protein microarrays, mass spectrometry-based proteomics, high-throughput enzyme activity assays, and large-scale isolation of protein complexes.

More info: <www.pnl.gov>

LAB WORK

NAVY MEDICAL DNA MAP SAVES LIVES

U.S. Navy scientists, led by Captain Daniel J. Carucci at the Naval Medical Research Center (NMRC), provided expert scientific guidance and technology, and critical leadership in collaboration with an international group of genome centers and funding agencies in publishing the complete genomic sequence of the human malaria parasite, *Plasmodium falciparum*.

Navy scientists provided critical protocols, reagents and expertise for the sequencing effort, including highly purified chromosomal DNA and, with its partner, The Institute for Genomic Research (TIGR), completed the sequencing of 4 of the 14 total *Plasmodium falciparum* chromosomes.

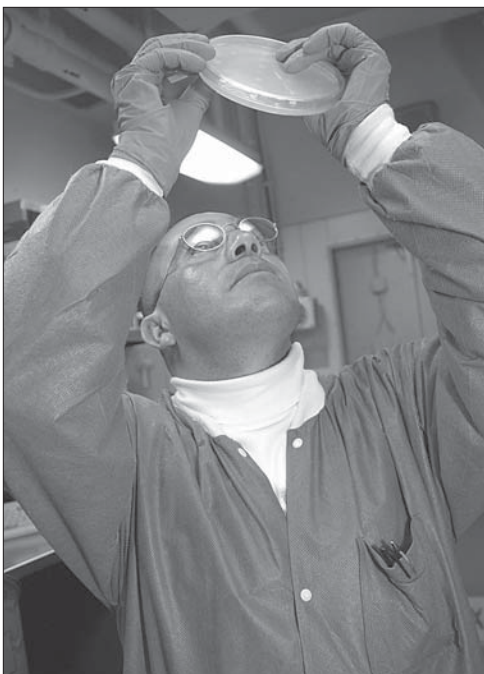
These same scientists accomplished the first-ever completed chromosome for malaria, which was published in *Science* in 1998, providing the foundation for completion of the remaining 14 chromosomes.

This completion was heralded by the National Institutes for Allergy and Infectious Diseases (NIAID) as one of the top five scientific accomplishments of 1998.

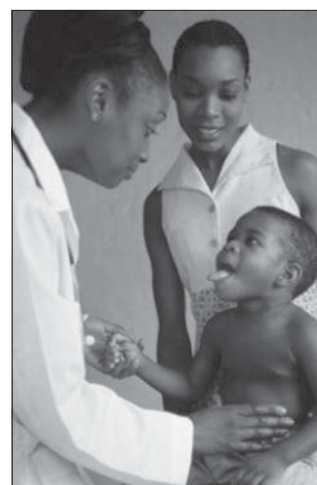
The completion of the malaria genome was recognized by *Science* as the third most important scientific breakthrough of 2002. The Malaria Genome Project provides the complete blueprint of one of the world's deadliest infectious diseases, as well as a major threat to U.S. military forces.

Research institutions across the world are now able to capitalize on the genomic and proteomic data, accelerating research and development on new antimalarial drugs, new targets for vaccines, the potential mechanisms of drug-resistant strains and have revolutionized the world research community's approach to controlling a pathogen that kills over 3 million people annually.

More info: Visit the Naval Medical Research Center at <www.nmtc.navy.mil>.



Aboard the USS George Washington, Hospital Corpsman 3rd Class Carlos Aguilar from Mexicali, Mexico, looks at bacterial growth on a petri dish in the ship's medical department.



Completing the malaria genome is a major factor in fighting one of the world's deadliest infectious diseases, which kills over 3 million people annually.

FLC NEWSLINK

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Published by the
Federal Laboratory Consortium
for Technology Transfer

Editor: Tom Grayson

Online subscriptions:
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FLC NEWSLINK is published 12 times a year by the Federal Laboratory Consortium for Technology Transfer (FLC) and the FLC Marketing and Public Relations Committee.

Opinions or views expressed in FLC NEWSLINK are those of the contributors and do not necessarily reflect those of the FLC, its officers, or its representatives.

TECH WATCH: FEDERAL LABORATORY TECHNOLOGIES READY FOR TRANSFER

NASA READY TO TRANSFER POLLUTION CONTROL

NASA seeks to transfer the NASA-developed air and water pollution control system. Developed at NASA's Marshall Space Flight Center (MSFC), this recirculating, bioaquatic pollution control system combines both water and air pollution controls into one system. Air pollution from automobiles, industrial plants, coal-burning power plants, incinerators, and furnaces have created serious environmental pollution problems.



These problems include depletion of the ozone layer, the greenhouse effect, as well as air pollution with heavy metals, toxic organics, and acid rain. Current air pollution control systems are expensive to install and operate, or their air pollution control efficiency is questionable.

The pollution control system can be implemented to process polluted air created by industrial furnaces used in power generation, incinerators, and industrial applications.

The benefits of the combined air and water pollution control system is the low cost of implementation and reduced disposal costs

compared to existing pollution control alternatives. This system eliminates the need for baffles, venturis, and injectors used in conventional systems.

The pollution control system is a combined wastewater and air pollution control system that combines exhaust combustion gases with flowing wastewater, which is then filtered through a rock/plant/microbial filtering system. The scientific basis for the waste treatment in a rock/plant/microbial

filter is the cooperative growth of both the plants and the microorganisms associated with the plants. A major part of the treatment process for degradation of organics is attributed to the microorganisms living in and around the plant root system. These microorganisms form a symbiotic relationship with plant roots that results in increased degradation rates and removal of organic chemicals from wastewater.

This technology is available for commercial applications (U.S. Patent 4,959,084).

More info: Visit the MSFC Center home page at <www1.msfc.nasa.gov>

"PURE" HYDROGEN

Devinder Mahajan, a chemist at the U.S. Department of Energy's Brookhaven National Laboratory (BNL), was recently issued U.S. Patent 6,596,423 for his development of a novel, low-temperature process of producing "pure" hydrogen for use in fuel cells.

The process may help address one of the most significant difficulties in developing efficient and affordable fuel cells—how to extend the life of the catalysts that make them work.



Researcher Devinder Mahajan uses a gas chromatograph to analyze carbon monoxide levels in hydrogen purified using his patented process.

Fuel cells combine hydrogen and oxygen without combustion to produce direct electrical power and water. They have been pursued as a source of power for transportation applications because of their high energy efficiency, their potential for source fuel flexibility, and their extremely low emissions.

More info: Visit BNL at <www.bnl.gov>

PROVEN TO WORK

BIOTECHNOLOGY GIVES IMMUNE SYSTEM A BOOSTER SHOT

Computer simulations, or experiments *in silico*, paved the way for subsequent genetic and biochemical experiments that yielded new information on how the body's immune system gets sent into action. This new information has resolved a scientific controversy and holds therapeutic implications for autoimmunity.

Working with a custom-configured cluster of microcomputers at Lawrence Berkeley National Laboratory (LBNL) and cells derived from transgenic mice at Washington University School of Medicine, a multi-institutional team of scientists has shown that an intercellular junction called the "immunological synapse" controls the strength and duration of signals that can activate T-cells, one of the body's principal lines of defense against infections.

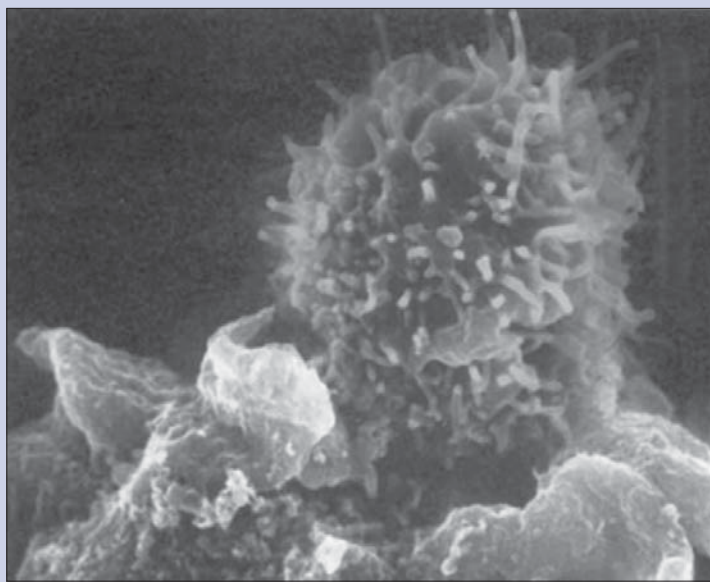
"We have found that the immunological synapse balances T-cell receptor signaling and degradation and, if this adaptive control function goes awry, T-cell activation will be misregulated," says Arup Chakraborty, one of three corresponding authors of a paper published in the September 25, 2003 edition of *Science Express*.

Chakraborty holds a joint appointment with LBNL's Physical Biosciences and Materials Sciences Divisions, and both the Chemistry and Chemical Engineering Departments of the University of California at Berkeley. The other corresponding authors were Andrey Shaw of the Washington University Medical School, and Michael Dustin of New York University (NYU).

Chakraborty, a pioneer of *in silico* experimentation for immunological research, is the first to capitalize on LBNL's

Scientific Cluster Support (SCS) program.

Through the SCS program, Chakraborty and his research group were able to acquire and use an 84-processor cluster to accurately model the role of the immunological synapse in T-cell signaling.



This T-cell, one of the immune system's principal means of defense, identifies the molecular signature of a dendritic cell at a junction between the two called the immunological synapse. If the immunological synapse signals the presence of a foe, the T-cell will attack.

"The results reported in this paper demonstrate how synergy between computational modeling and genetic, biochemical, and imaging experiments can solve important problems in cellular immunology," said Chakraborty. "Our success should encourage further synergistic computational and experimental studies."

William McCurdy, Associate Laboratory Director for Computing Sciences at LBNL, who initiated the SCS program, said, "This is the first example of a new kind of scientific support that LBNL is offering investigators.

It is part of a continuing shift in our

scientific culture towards more intensive use of computing in research."

Computational models are ideal for studying complex phenomena with properties that emerge as a result of many linked variables.

This describes the human immune system, an interdependent network of many different cell types that collectively protects our bodies from bacterial, parasitic, fungal and viral invaders, and against the growth of tumor cells.

The process begins when markers on the surface of a cell called "antigens" identify the cell as "non-self."

In response, the cellular warriors of the immune system will attempt to engulf and kill the invader.

Among these warriors are the lymphocytes (white cells) from the thymus, or T-cells, whose appropriate activation is critical to a person's health and well-being.

"T-cells are the orchestrators of the adaptive immune response system," explained Chakraborty.

"They are responsible for reading the molecular signatures on cell surfaces, detecting the presence of pathogens and leading a counterattack."

Chakraborty calls the findings on the immunological synapse reported in this paper "the tip of the iceberg" in terms of understanding exactly how T-cells detect and respond to threats.

It is a good demonstration, however, of what can be accomplished when the *in silico* approach to experimentation, a widely accepted tool in the physical sciences, is used to complement genetic and biochemical experiments in the biological sciences.

More info: Contact Lynn Yarris of LBNL at <lcyarris@lbl.gov> or visit <www.lbl.gov>

KC DELIVERS THREAT TECH, FROM PAGE 1

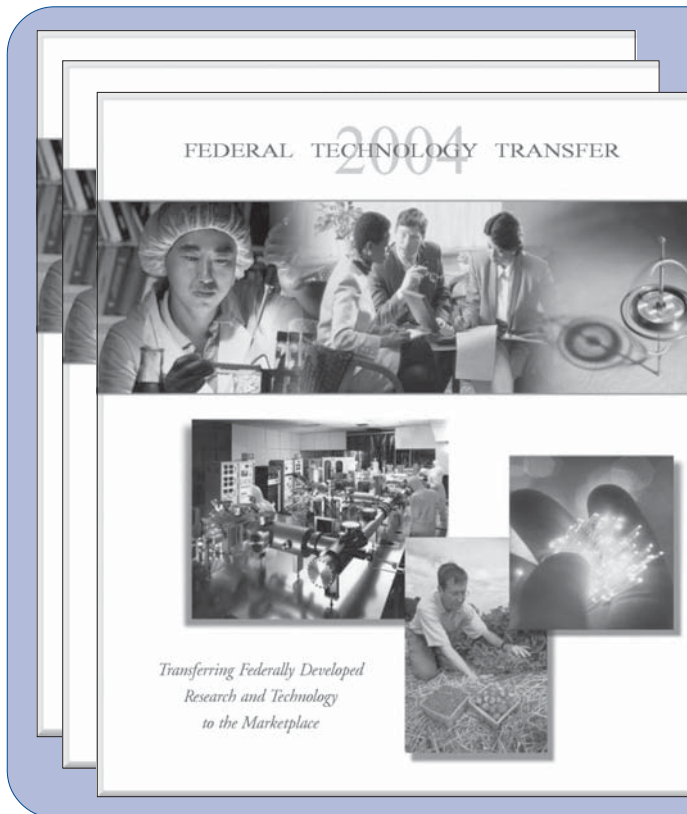
delivers real-time data to first responders, military, scientists/laboratories, and law enforcement and government agencies.

The demand for smaller and easier-to-use technologies for our nation's first responders became top priority following the events of Sept. 11, 2001.

PIRATE meets the demand through the flexibility of the system architecture, which enables customization and miniaturization and reduces the at-risk factors for first responders.

As a national security asset, the Kansas City Plant is committed to using cutting-edge technologies and scientific expertise to make America safer. PIRATE is the beginning of the facility's quest to leverage its existing resources into technological tools that help protect our homeland.

First responders, the private sector and the federal laboratories will be important partners in this endeavor.



2004 Federal Technology Transfer

From exotic medical equipment to items filling supermarket shelves, *Federal Technology Transfer 2004* highlights and describes successful technology transfers having their genesis in the federal laboratory system. Being of high potential impact and human interest, the technologies listed in this publication have completed their transition from research to results via the technology transfer process.

To order your copy, contact the FLC MSO at 856-667-7727

TECH FOR STUDENTS, FROM PAGE 1

The directorate started the year-old program as an incentive to encourage students to become more interested in math- and science-related fields. The students can use the computers, or they can take them apart and study the parts of the computer, Janiszewski pointed out.

"We use the computers in our A+ and Cisco classes," said McIntosh. "In these classes, the students take the computers apart and rebuild them; and, if they successfully complete the class, they get to take the computers they have built home with them."

Northridge Local School District also has a community outreach program that tutors students. The computers are a great resource for the students being tutored, said McIntosh.

Also benefiting from this program is Our Lady of the Rosary School, a small private institution located in Old North Dayton that provides instruction for kindergarten through eighth grades.

"The donations of the computer systems and parts will allow us to offer a broader technology base for each of our students," said Cindy Todd, computer lab teacher.

"We have even been able to form a Programming Club, and some of the students are learning how to build and

troubleshoot computers. The students learn what is involved in the assembly of the computer and what is involved in the software installation."

According to Janiszewski, after the schools are contacted with an offer to participate in the program, they respond if interested and the ball starts rolling.

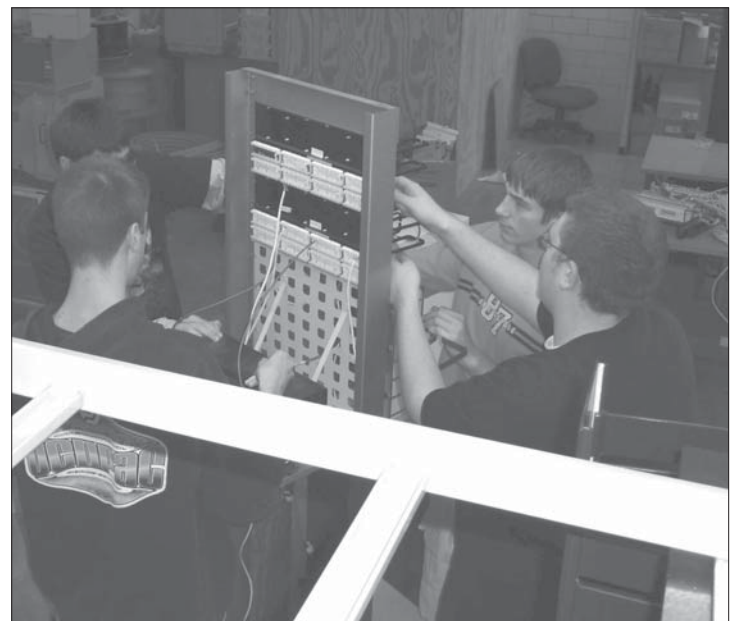
The technology transfer branch in the Sensors Directorate creates educational partnership agreements with the schools, ensuring that the computers can be donated directly to the schools.

"Once we have received a response from the interested districts, I e-mail the inventory list to everyone and it is first come, first served," said Janiszewski. "It is a fair process that allows all schools to get a chance to put in their requests."

Teachers from participating school districts say their classes benefit greatly from the computers.

"The people at AFRL were extremely helpful and generous about helping us in

any way possible," said McIntosh. "The staff here at Northridge greatly appreciates



A "patch panel" is used to connect multiple computers or servers using an Ethernet cable. Northridge students were provided with a bare patch panel that they had to wire to the patch panel. To verify their work, two or more computers had to communicate with each other.

this opportunity to expand our technology department, as I am sure other schools do as well."

ARS TURNS 50, FROM PAGE 1

about 100 locations across the country and overseas.

ARS scientists constructed the first gene maps of cattle, discovered that boron is an essential trace nutrient for humans, helped triple milk production per cow, and eliminated the screwworm from the United States and other countries.

"ARS has had many specific accomplishments that have been critical to the continued vitality of American agriculture," said Edward B. Knipping, acting ARS administrator. "But the agency's work as a whole is an essential part of the long research continuum that allows us to improve our stewardship of the environment, while making our food and agricultural products more affordable, safer and more abundant."

In celebration of its anniversary, ARS will host numerous special events over the coming year, including a recognition ceremony hosted at USDA headquarters in Washington, D.C., on Dec. 11, a national scientific leadership meeting in New Orleans in January 2004, and open houses

and field days at its various locations.

ARS conducts research in every facet of agriculture, responding quickly to new problems as they arise, carrying out long-term research beyond the scope of commercial businesses, providing research support to USDA action and regulatory agencies, and helping to improve the quality of life for rural communities.

While ARS was officially created in 1953, the agency has deep roots that go back more than a century.

When Abraham Lincoln created the USDA in 1862, the founding legislation called for the new department to acquire



The human nutrition research program is helping discover how people's nutritional needs differ by gender, age, activity level, and many other factors, such as the impact of weight training on bones and calcium.

"useful information connected with agriculture in the most general and comprehensive sense."

Within four years, a Division of Botany was created, soon followed by the Division of Microscopy and, in 1873, the Bureau of Animal Industry and other scientific units. Many of these were merged in 1953 to form the core of today's ARS.

For the modern ARS, the mission goes beyond improving agricultural production. ARS research also helps develop agricultural commodities into new biobased products such as biodiesel fuel made from soybeans that can power cars, buses, planes and heating plants. Such advances benefit the farmer, the consumer and the environment.

More info: www.ars.usda.gov

NEW FLC DATABASE IDENTIFIES AVAILABLE T² E&T RESOURCES

In a continuing effort to study education and training within the technology commercialization scene, the FLC Education and Training (E&T) Committee has begun an analysis of the information in its new database of technology transfer (T²) education and training resources (i.e., courses, seminars, programs, etc.).

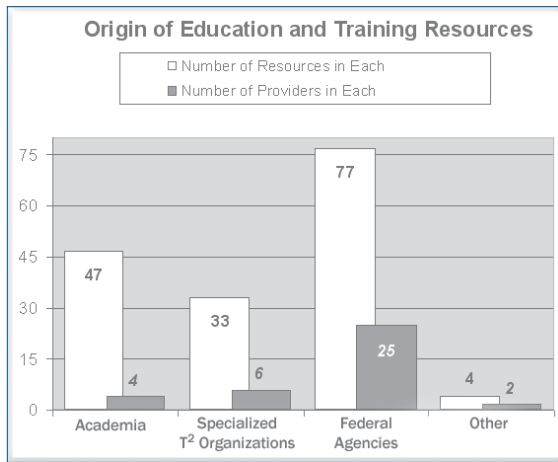


Figure 1

and NTTC) [20%] and in universities [30%], but the majority come from federal laboratories and agencies.

Some interesting patterns have emerged as we have begun our data analysis.

The vast majority (78%) of the training resources require no more than five hours of total contact time (see Figure 2).

Does this mean that students respond most positively to very short courses?

Is there growing demand for short courses or are shorter courses simply easier to provide? We do not yet know the answer to these questions, but we aim to identify the reality behind these numbers during coming months.

The lecture is by far the most popular instruction method among providers of education and training in technology transfer, with almost three-quarters of all resources delivered by this method.

Does this mean that the lecture format is the most appropriate form of pedagogy for technology transfer, or does it simply reflect the fact that lecturing is the easiest and most orthodox type of instruction?

Our research to date has focused on identifying resources currently available, but in the future we hope to place more attention on assessing needs for technology transfer education and training, including the types of instructional methods (e.g., lecture, self-study, seminar, etc.) that work most effectively.

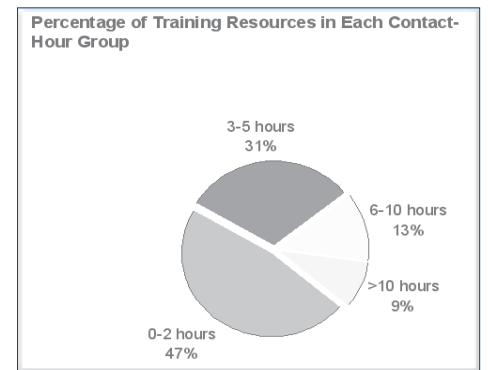


Figure 2

SEE E&T RESOURCES, PAGE 6

DC ON T², FROM PAGE 1

statutory framework for technology transfer is fundamentally sound. The legislation enacted in the early 1980s, which recognizes the importance of universities and businesses in retaining commercial intellectual property rights, has led to a record number of commercial successes, including the creation of entirely new technology-based industries. This has led many nations to envy our technology transfer model, with numerous attempts to replicate it.

While stating that their conclusions were generally favorable, PCAST did issue ten recommendations designed to foster improvements in technology transfer.

In the analytical phase of their study, the PCAST panel studied various technology transfer mechanisms; conducted hearings with government, academia, and industry; conducted an open forum; and solicited input in writing from all interested parties. In leading up to their recommendations, the PCAST panel said, "A teamwork approach among federal agencies and the private sector will help achieve improved success."

PCAST Recommendations

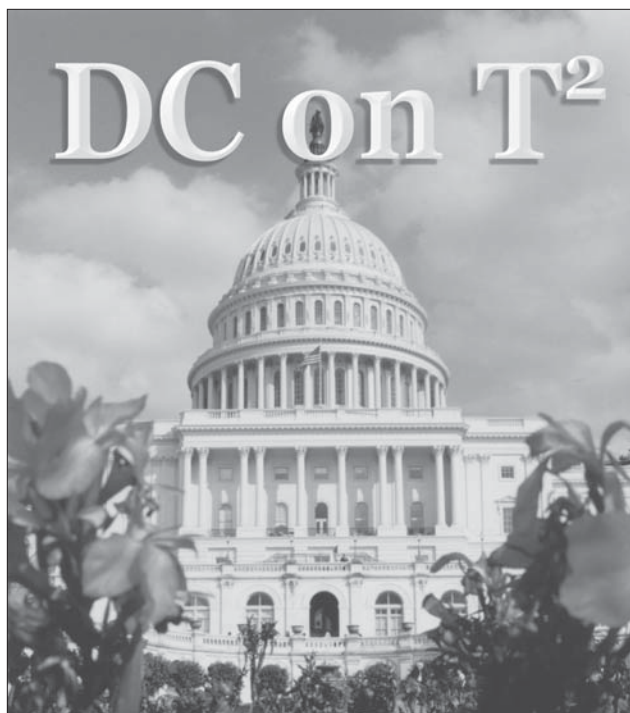
1. "Existing technology transfer legislation works and should not be altered." While different industry sectors have had different levels of success in technology transfer, the panel suggested that improving the methods and practices for technology transfer, while being flexible to change, is more important than changing the statutory framework.

2. "Federal agencies, government laboratories, and the Department of Commerce (DOC) need to formalize their oversight of and accountability for technology transfer." In amplification of this point, PCAST recommended "that the President request that all agencies specifically commit to technology transfer in their individual mission statements."

3. "Industry differences need to be recognized and practiced by institutions licensing government-sponsored technology, but made consistent with individual disciplines." The panel encourages consistency of approach by

research activities doing technology transfer in a specific industry, while at the same time being flexible in their dealings with different industries.

4. "The Department of Commerce should document 'Best Practices' for technology transfer, as well as refine a set of metrics to better quantify practices and their effectiveness." The panel felt such a document would facilitate more rapid progress for institutions facing a new learning curve, and set forth the expectations of first-time licensees.



5. "The Department of Commerce should include 'education' as part of its technology transfer mission and task the individual agencies to disseminate related materials specific to their research and development programs." The panel suggested that DOC develop general educational materials that the individual federal agencies can tailor to reflect their particular R&D programs. The panel also suggested that DOC can accomplish this without significant additional resources by working through the FLC.

6. "Individual agencies and government laboratories need to provide regular transaction 'process reviews' to reduce the complexity of, and time required to complete technology transactions."

7. "The Office of Science and Technology Policy should assist the new Department

of homeland security in rapidly developing technology transfer policies and capabilities that meet the immediate and long term agency needs." The panel recognizes the pressing needs of homeland security and the vital role that technology transfer will play in achieving its mission.

8. "The Government should centralize information on technology transfer into a single, accessible location." The panel suggested that the E-Government task force examine ways to aggregate or access information on U.S. and international participants, including government, industry, universities, private research institutions, and individual practitioners from a range of professional disciplines.

9. "The Department of Commerce should study and assess the implications for technology development and transfer in a global environment, as well as the possible effects of emerging technologies." The panel wrote of the need for DOC to document the growing international systems for technology transfer.

10. "Recent discussions about the availability of research tools that result from federally-funded research need to be monitored to insure that there is a balance in the protection of the commercial value of such inventions and assurance of access to these tools for further research and exploration."

In addition to these ten recommendations, the panel identified two other factors that bear on the ability to succeed at technology transfer. The first was the need to continue a national commitment to strong technological education, training, and a full "pipeline" of talent. The second was to continue striving toward better metrics and better documented metrics. The panel's concern was that anecdotal data, while readily available, are not the best or most consistent way to measure this complex process.

To learn more about technology transfer legislation and policy, write Dave at <dappler@fldc.enchost.com> or contact him at 703-414-5026.

ETC...

E&T RESOURCES, FROM PAGE 5

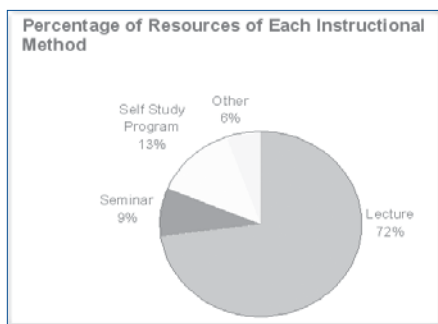


Figure 3

Online training seems to be a popular choice among training resource providers, with 42% of the resources documented within our database being offered online. Is this popularity driven by the desire for cost savings? Or is online training more effective educationally than traditional modes?

Our research reveals informal evidence of a strong preference

among T² professionals for the online mode of delivery, which may partially explain the apparent strong support for this option by educational providers. The FLC E&T Committee, chaired by Lynn Murray, continues 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. The FLC T² Training Resources Database is scheduled for operation in early 2004.

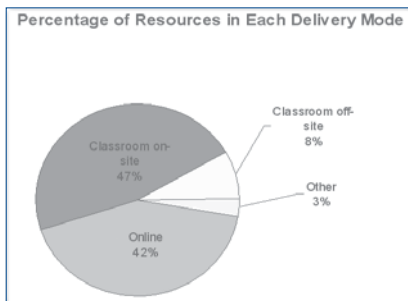


Figure 4



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