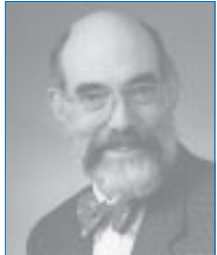


Awards Issue for Excellence in Technology Transfer

Each year the FLC salutes the best and brightest of federal technology transfer. The FLC's success is due largely to the government scientists and technical personnel who pursue their visions. These individuals take cutting-edge concepts and turn them into everyday realities.

Equally important are the people in federal laboratories who have dedicated themselves to encouraging and initiating partnerships with the private sector to make technology an invaluable part of our lives.



Dr. Thomas Baldwin

Each year the FLC celebrates this innovation and rewards its partnerships through the FLC Awards for Excellence in Technology Transfer. This year's ceremony took place in Tucson, Ariz., May 7, 2003, as part of the FLC national meeting.

Co-emcees **Tyrone Taylor** of Unisphere Inc., and **Dr. Thomas Baldwin**, Director of the University of Arizona's Institute for Biomedical Science and Biotechnology, led a night that highlighted the diverse technology transfer efforts of the FLC and its member laboratories.

To showcase the scope of technology transfer, the FLC presents awards in the following areas:

- **Excellence in Technology Transfer**—Presented to individuals in the FLC who have successfully transferred federally developed technologies.



The awards ceremony extravaganza kicked off with a Native American season dance.

- **Laboratory Director of the Year**—Recognizes directors of FLC member laboratories for their contributions to the overall enhancement of technology transfer for economic development and their support of the FLC and its activities.
- **Service Awards**—Presented to individuals, inside or outside the FLC, who have provided significant support to the technology transfer process, furthering the FLC's mission.

The FLC awards are a prestigious honor in the technology transfer world, with dozens of federal laboratories submitting nominations each year. These awards have become not only a crowning achievement for the winning laboratories, but a great source of pride for their government agencies.



Tyrone Taylor

This special issue of *FLC NewsLink* is dedicated to the award-winning individuals who prove the future is now.

Readers will be impressed with how these individuals worked together to use their experience, expertise, and resources to create technologies and products that have an impact on our daily lives.

FLC Names Laboratory Directors of the Year

The FLC honors Laboratory Directors who have made maximum contributions to the overall enhancement of technology transfer for economic development. Their accomplishments include support of FLC activities, internal efforts, industry involvement, and community service.

The 2003 Laboratory Directors of the Year are **Dr. Thomas Barton** of the Department of Energy's **Ames Laboratory** and **Joseph Zarzycki** of the U.S. Army's **Edgewood Chemical Biological Center**.

Collaboration has been a critical key to the success of the DOE's Ames Laboratory.

Integrated into the campus of Iowa State University (ISU), many of the laboratory's researchers hold joint appointments, acting both as a faculty member and as a laboratory researcher.

As Laboratory Director, Dr. Thomas J. Barton has emphatically supported technology transfer by creating an Office of Industrial Outreach, appointing a full-time ORTA and, most importantly, providing an environment where scientists and researchers are encouraged to develop partnerships and use the basic research to develop applied technologies and processes that benefit the U.S.

Dr. Barton has reinforced Ames' core expertise in developing novel materials. This has lent itself to the transfer of new materials, processes and technologies worldwide. Nowhere is that more evident than in the work of the laboratory's Materials Preparation Center (MPC), a DOE Office of Science user facility that provides high-purity metal samples for research institutions and industry.

The MPC has responded to over 3540 requests for specialized materials preparation and characterization services during its 20 years of operation. In addition, the Iowa Companies Assistance Program (ICAP), a specialized service of the MPC, provides access to the vast array of resources available at ISU, including access to the Ames Laboratory's MPC. ICAP, funded by the state

of Iowa, has for nine years provided Iowa manufacturers with short-term, no-cost technical assistance with materials analysis, characterization, and testing; and, in 2002 recorded more than 115 projects that impacted the competitiveness of Iowa manufacturers.



Dr. Thomas Barton
Ames Laboratory

Three recently launched initiatives during 2002 illustrate Dr. Barton's commitment to technology transfer and its importance to the continued growth of the laboratory: The Midwest Forensic Resource Center (MFRC), the Biorenewable Resources Consortium (BRC), and the Green Chemistry Catalysis Laboratory (GCCL). Each of these achieved funding outside of the "normal" course of DOE

programmatic funding as a result of innovative activities and partnerships authorized and promoted by Dr. Barton.

FY02 was a unique year for technology transfer at the Edgewood Chemical Biological Center (ECBC).

The tragic events of 9/11 and the war on terrorism had a profound impact on the nation. Closures of public and private buildings to contend with anthrax contamination, the urgent need for technologies to address public safety concerns, and the formation of a new Homeland Security Department were unprecedented events in the nation's history.

ECBC, under the leadership of Jim Zarzycki, used its technology transfer program to meet some of the challenges presented in 2002. Technologies developed to protect soldiers on the battlefield were transferred to other government agencies and industry partners for the protection of private citizens.

Mr. Zarzycki enhanced the technology transfer program at ECBC to meet this unprecedented challenge, while continuing to support other commercial applications of ECBC technologies. Throughout FY02, ECBC served as a vital partner to industry in numerous collaborations.

ECBC is a recognized leader in applying state-of-the-art science, technology, and engineering to chemical and biological (CB) defense problems. The federal laboratory provides CB solutions to the warfighter and to U.S. civilian authorities at all levels of government. ECBC has a long history of involvement in technology transfer and is an active member of the FLC under Mr. Zarzycki's direction.

As the threat posed by CB agents has grown over the years, Mr. Zarzycki has encouraged the widespread dissemination of information about the laboratory's technologies and capabilities to combat this threat. Accomplished through an aggressive outreach campaign – including an award-winning web site, press releases, publications, technical presentations, symposia, and exhibits at a wide range of conferences and



Joseph (Jim) Zarzycki
Edgewood Chemical
Biological Center

trade shows – ECBC has taken the lead in providing technology solutions to public safety matters regarding CB agents.

In addition, Mr. Zarzycki has continued to support a number of organizations and causes that include technology transfer within their charter. Examples include the FLC, the Northeast Maryland Technology Council, the Aberdeen Proving Ground Science & Technology Board and its Business Development Office, the Maryland Technology Development Corporation, and the NASA/DOD-sponsored TECHLINK.

2003 Awards for Excellence in Technology Transfer

Innovative Fruit Processing for Promoting Health and Sustainable Rural Communities

Department of Agriculture
Agricultural Research Service, Pacific West Area
Western Regional Research Center

Cutting-edge research conducted by **Dr. Tara McHugh** and **Dr. Charles Huxsoll** has led to the development of a new industry to manufacture 100% fruit and vegetable products. These new products can be made from fruits and vegetables that are too small or have



Dr. Tara McHugh

cosmetic imperfections, and thus cannot be sold as fresh produce. These fruits and vegetables are converted to purees and refrigerated. The purees are then used to form edible pieces, bars, and novel shapes such as straws, sausage casings, and film barriers to wrap other food products.

To successfully transfer this technology, Drs. McHugh and Huxsoll have initiated several partnerships with numerous companies, including HR Mt. Sun, Hadley Yosemite Farms, Yorkshire Dried Fruit & Nut Co., Mead Johnson & Company, and Gilroy Foods. The technology transfer from these partnerships is in varying stages, from prototype development to licensing and production.

The products resulting from this team's technology offer a unique mix of benefits to the general public. This technology is expected to increase fruit and vegetable consumption in the U.S. In addition, American produce growers will find that their production will have increased value since they will be able to make use of produce that cannot be sold in a retail setting.

Contact: Dr. Tara McHugh, (510) 559-5864, thm@pw.usda.gov

Electric Commerce and Print-on-Demand for Nautical Charts

Department of Commerce
Office of Coast Survey
National Ocean Service

Nautical charts are a fundamental tool of marine navigation. Hundreds of critical changes are made to them every week. Unfortunately, traditional printing methods required as many as 38 weeks to print new editions, which meant that charts were dangerously out-of-date when they rolled off the press. To remedy this problem, a team from the Office of Coast Survey developed large format, full-color, variable data, on-demand printing technology. This technology prints charts only when ordered and from digital files that are updated daily.



David Enabnit

The team also developed electronic commerce software for chart ordering, which controls the automatic assembly and printing of charts from the up-to-date digital files. Through a CRADA between the Office of Coast Survey team and OceanGrafix, LLC of St. Paul, Minnesota, an industrial-strength Print-on-Demand/e-Commerce system was built.

Today, the National Oceanic and Atmospheric Administration (NOAA) and OceanGrafix are jointly using the system to produce NOAA's suite of 1,000+ nautical charts.

The benefit of this technology is having current nautical charts to help mariners meet federal regulations and avoid catastrophic marine accidents. In addition, this technology avoids the annual \$17.5 million cost to correct charts by hand and reprint them.

Contact: David Enabnit, (301) 713-2770 x132, Dave.Enabnit@noaa.gov

Design, Development, Training, Fielding, and Continued Consultation for Mobile Laboratories

Department of Defense—U.S. Army
Edgewood Chemical Biological Center

In the event of a chemical, biological or radiological terrorism attack, first responders, military leaders, and federal agencies need tools that will allow them to sample and analyze materials in and precise and uniform manner. A team from the Edgewood Chemical Biological Center (ECBC) has been active in all aspects of improving mobile laboratories and providing solutions for the efficient and accurate field analysis of chemical and biological materials. The technologies developed by this team include the development of turnkey capabilities that integrate and standardize field sampling, as well as analysis tools that support users. Additionally, the technologies address regulatory issues concerning transportation, environmental law, and safety compliance.

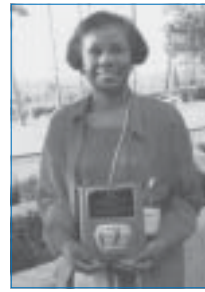


From left: Charles Henry, Monica Heyl, and Dr. Dennis Reutter

Numerous partnerships using CRADAs, patents, license agreements, and transfer mechanisms contributed to the success of the project. To date, those partners include Purified MicroEnvironments, Quick Silver Analytics, Inc., the FBI, and the U.S. Food and Drug Administration.

Both the public and private sectors have directly benefited from ECBC's mobile laboratory technologies. This team has provided improved strategies that will ultimately enhance law enforcement efforts to protect the U.S. against terrorism and the threat of weapons of mass destruction.

Contact: Monica Heyl, (410) 436-8616, monica.hey@sbccom.apgea.army.mil



Barbara Gray

Antibody Engineering for Expression in Insect Cells and Larvae

Department of Defense—U.S. Army
Edgewood Chemical Biological Center

This technology addresses an advanced method for manufacturing recombinant proteins in insect cells and larvae. It consists of genes for a recombinant antibody that binds a biological warfare agent. The genes were cloned in a way that makes it possible to produce the antibody in insect larvae. Antibodies are currently deployed as the recognition component of sensors that detect biological threat agents.

The Edgewood Chemical Biological Center (ECBC) team is transferring this technology through a partnership with Chesapeake PERL (C-PERL), a company based in College Park, Maryland. By way of a CRADA, C-PERL scientists are pioneering a technology that transforms insect larvae into miniature protein factories. This is the latest attempt to manufacture biological material for new medicines.



Terry Chase

The CRADA has proven to be successful for both ECBC and C-PERL. In particular, the partnership enabled C-PERL to more than double the size of its staff. Last year, the company won the Maryland Biotech/Life Sciences Incubator Company of the Year Award and was featured in over 20 news articles—including *Fortune Magazine's* "Coolest Companies of 2002."

Contact: Dr. Kevin O'Connell, (410) 436-5999, kevin.oconnell@sbccom.apgea.army.mil



Dr. Kevin O'Connell and Patricia Anderson

Small-Scale Cogeneration of Heat and Electric Power

Department of Defense—U.S. Army
U.S. Army Natick Soldier Center

The first practical small-scale cogenerator, developed by the team of **Don Pickard** and **Frank Dileo**, efficiently provides the energy needs of a battalion-level field kitchen.

Cogenerators produce heat and electric power from one process 80 percent more efficiently than separate heaters and generators. Instead of using dry saturated or superheated steam as in a conventional Rankine cycle, a high temperature two-phase mixture of steam and water is injected into an expander. The alternator coupled to the expander produces electrical power, while the remaining heat is used for cooking and sanitation.

The resulting prototype was a success and led to the two largest home HVAC manufacturers expressing an interest in the cogenerator. The technology was formally transferred when Yankee Scientific and ECR International formed a joint venture called Climate Energy LLC to develop and market the technology.

Electric power generation using small-scale cogenerators uses less fuel, the fuel burned is cleaner, and the fuel is burned over a broad area.

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Frank Dileo and Don Pickard

FLC NewsLink

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Optical Real-Time Adaptive Spectral Identification System

Department of Defense—U.S. Navy
Naval Research Laboratory

The Optical Real-Time Adaptive Spectral Identification System (ORASIS) is a software application for the analysis and compression of hyperspectral images that is based on a patented algorithm from the Naval Research Laboratory (NRL).

Hyperspectral images are composite images made up of multiple pictures of a "scene" taken at different wavelengths. This technology mathematically identifies constituent components and maps their abundances within the image.



Dr. Jeffrey Bowles

Through the efforts of **Dr. Jeffrey Bowles**, ORASIS has been transferred to Advanced Power Technology, Incorporated (APTI) under the terms of a nonexclusive license with NRL. Using the technology, the licensee is selling value-added earth image analysis products and services, such as customized maps, and systems for remote sensing data collection and analysis.

The earth image products from ORASIS will be used for oil, gas, and mineral exploration; environmental assessment; crop analysis for optimizing irrigation and fertilization; and military remote sensing. Based on the array of areas in which the technology can be applied, the individuals, businesses, agencies, etc., that will benefit range from doctors and patients to farmers, manufacturers and oil companies.

Contact: Dr. Jeffrey Bowles, (202) 404-1021, Jeffrey.Bowles@nrl.navy.mil

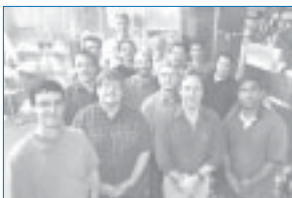
Extreme Ultraviolet Lithography Tool

Department of Energy
Lawrence Berkeley National Laboratory
Lawrence Livermore National Laboratory
Sandia National Laboratories



Sandia Team

Years ago, it would have taken a roomful of hardware to match the computing power of today's average laptop computer. One key to progress has been the steady improvement in ultraviolet lithography, the photographic process used to print integrated circuits on computer chips. However, current lithographic technology has reached its limit because its lenses absorb the shortwave extreme ultraviolet light (EUV) needed to print even small chips. A team from Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories—working together as the Virtual National Laboratory (VNL)—has developed a next-generation lithography called Extreme Ultraviolet Lithography (EUVL).



LBNL Team

EUVL technology has been transferred under a CRADA to the Extreme Ultraviolet Limited Liability Company (EUV LLC), a consortium whose members include Advanced Micro Devices, IBM, Infineon, and Intel.

Contact: David Attwood, (510) 486-4463, DAttwood@lbl.gov

Globus Toolkit

Department of Energy
Argonne National Laboratory

The Globus Toolkit™ is a community-based, open-architecture, open-source set of software services and libraries that support computational grids. A grid connects geographically and organizationally dispersed resources, including large-scale computers, archival storage systems, scientific and engineering instruments, and human collaborators.



From left: Dr. Ian Foster, Dr. Carl Kesselman, and Steve Tuecke

This technology, developed by a team at Argonne National Laboratory (ANL), has already transformed collaborative scientific research across the world and is the basis for new distributed computing strategies of such companies as IBM, Microsoft, Platform Computing, Entropia, and Compaq.

The team has been able to transfer the technology with contributions from IBM and Microsoft, as well as funding from the National Science Foundation and the Department of Energy. The transfer of the Globus Toolkit™ to the marketplace took a huge turn in 2001, when 11 of the top information technology companies committed to incorporating the toolkit as a standard mechanism for their grids.

Once it is widely available, virtually every computer user will benefit from this technology. The Globus Toolkit™ will permit individuals and organizations to make decisions based on the best available technology.

Contact: Dr. Ian Foster, (630) 252-4619, foster@mcs.anl.gov

Smart, High-Performance Polyphenylsulfide Coating System

Department of Energy
National Renewable Energy Laboratory
Brookhaven National Laboratory

The development and transfer of the polyphenylsulfide (PPS) coating system represents a giant step forward in the technology of coating steel surfaces for use in hostile corrosive environments. The PPS coating system protects surfaces from corrosion, oxidation and



Dr. Keith Gawlik

fouling, and has a high thermal conductivity that can also repair itself. This technology can be used in a wide range of applications and is more durable, abrasion-resistant, and less costly than competitive coatings. To transfer this technology, the team of **Dr. Keith Gawlik** of the National Renewable Energy Laboratory and **Dr. Toshifumi Sugama** of Brookhaven National Laboratory relied on their knowledge of the technology, the market, and their professional relationships to quickly move the PPS coating system from the laboratory to production. Bob Curran & Sons, a Texas-based company, needed a coating system to replace its current phenolic coating base.

Gawlik and Sugama worked with the company to develop and test a commercial version of the technology. In nine months, the company made PPS its primary product.

Contact: Dr. Keith Gawlik, (303) 384-7515, keith_gawlik@nrel.gov



Dr. Toshifumi Sugama

Visualization Tool for Alignments (VISTA)

Department of Energy
Lawrence Berkeley National Laboratory

In the field of comparative genomics, scientists can compare the human genome with those of other organisms to identify common regions of DNA; gain insights into how genes are switched on and off; and further their understanding of the human genome's evolution, structure and function. In some ways, sequencing the human genome was the easy part; the more difficult task of understanding and analyzing the functions of



Alexander Poliakov

nucleotide pairs in human cells still lies ahead.

Recognizing this need, a team from Lawrence Berkeley National Laboratory (LBNL) developed a user-friendly computer program called Visualization Tool for Alignments (VISTA).

This technology was developed and transferred by a team of biologists, mathematicians, and computer scientists at LBNL and the University of California at Berkeley (UCB).



Inna Dubchak

By making the program publicly available online, the team made it possible for researchers to register and submit genome sequences electronically. Licenses for VISTA are available free of charge to academic and nonprofit organizations.

Contact: Inna Dubchak, (510) 495-2419, ILDubchak@lbl.gov



Lior Pachter

PVSCAN/PV Reflectometer

Department of Energy
National Renewable Energy Laboratory

The PVSCAN is a photovoltaic (PV) scanning analyzer for use by the semiconductor industry. It is an optical system that rapidly scans, maps, and characterizes defects present in PV wafers and cells while measuring the photoresponse of cells. The use of PVSCAN



Dr. Bhushan Sopori

can increase the yield of high-quality wafers for processing. The PV Reflectometer is an instrument that is used for the inline monitoring of several solar-cell fabrication steps for all solar cell technologies, especially silicon PV technology.

Dr. Bhushan Sopori, the inventor of both technologies, initiated the technology transfer process. Through licensing and other transfer mechanisms, Dr. Sopori established a partnership with GT Equipment Technologies, Inc. (GTI), a company that provides manufacturing equipment to the semiconductor and materials industries. Within months of the partnership's formation, the first PVSCANs were shipped to customers, and there are prospective customers for the PV Reflectometer.

The primary users of both technologies will be those in the international PV community. A secondary market includes the thin-film PV community and part of the semiconductor industry, such as those who make solid-state lasers or diodes.

Contact: Dr. Bhushan Sopori, (303) 384-6683, bhushan_sopori@nrel.gov

High Speed Vaccine Injector System

Department of Energy
National Nuclear Security Administration
Kansas City Plant

Providing fast, large-scale inoculations without spreading blood-borne pathogens is a longstanding veterinary and human healthcare challenge. Needle-free systems offer important advantages over traditional syringe and needle systems—reduced pain, improved worker safety, safer disposal of potentially dangerous needles and related waste, and lower costs.



The Needle-Free High Speed Vaccine Injector System, developed by a team at the NNSA Kansas City Plant, solves this problem. The injector pushes into the patient a very small stream of vaccine under high pressure through a nozzle covered with a disposable protective cap. Up to 600 injections per hour are possible.

The technology was developed through a partnership between the operator of the Kansas City Plant, Honeywell Federal Manufacturing and Technologies; Felton International; and three Russian companies. Plans for 34 different injectors are in the process of completion, at which time the Russian companies will manufacture the parts, and Felton International will handle marketing and distribution.

While the initial application of the technology was for veterinary use, human patients will be the ultimate beneficiaries. **Contact: Paul Quirk, (816) 997-2457, pquirk@kcp.com**

Expression Data Clustering Analysis and Visualization Resource

Department of Energy
Oak Ridge National Laboratory

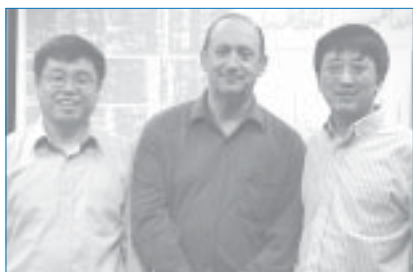
The Expression Data Clustering Analysis and Visualization Resource (EXCAVATOR) is a

patentable computer package for gene-expression data clustering and analysis. It enables researchers to more

efficiently “mine” key information from massive amounts of gene expression data. With EXCAVATOR, even researchers with limited computer skills can analyze gene-expression data in seconds. With this information, genetic diseases can be diagnosed more quickly.

Once this technology was successfully developed by the Oak Ridge National Laboratory team, several commercial companies expressed a strong interest in obtaining licensing. ApoCom Genomics, a Knoxville, Tennessee-based company, received licensing rights for EXCAVATOR in 2002. Currently, ApoCom is marketing the technology and providing user support.

EXCAVATOR’s capabilities will help researchers understand related biological processes in diseases and develop better methods for diagnosis and targeted treatment. **Contact: Ying Xu, (865) 574-7263, xuy1@ornl.gov**



From left: Dong Xu, Victor Olman, and Ying Xu

Any Source, Any Position Fluid-Handling Device

Department of Energy
Oak Ridge National Laboratory

The Any Source, Any Position (ASAP™) fluid-handling system is an enabling technology for analytical dispensing tools used for biochemical analysis.

This technology rapidly transfers small volumes of chemicals in parallel from multiple sources to multiple targets—the type of manipulation necessary when performing the vast number of chemical assays required for screening pharmaceuticals or analyzing genetic material.

The ASAP™ fluid-handling system was conceived jointly by Oak Ridge National Laboratory and Rheodyne, L.P. Patent licenses for the technology were obtained by Rheodyne, which created a spinoff company, Innovadyne. Innovadyne owns the worldwide exclusive license and ASAP™ trademark.

The ASAP™ received an *R&D Magazine*’s R&D 100 Award in 2002.

The benefits of this technology to the consumer include faster discovery, development, and availability of new drugs; quicker medical diagnoses; and reduced costs for both.

Contact: Mitchel Doktycz, (865) 574-6204, doktyczmj@ornl.gov



J. Steven Hicks and Mitchel Doktycz

ORNL Carbon Composite Bipolar Plate

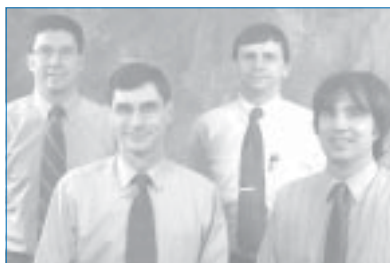
Department of Energy
Oak Ridge National Laboratory

To meet energy conservation and pollution reduction goals, the Department of Energy is encouraging the development of fuel cell-powered electric vehicles. The proton exchange membrane (PEM) fuel cell is a likely candidate to power vehicles because it starts quickly, operates at low temperatures, and creates no pollution. However, current PEM fuel cells are too heavy and too expensive for practical use in vehicles. Their machined graphite electrodes account for most of their weight and cost. The Carbon Composite Bipolar Plate was developed to meet the need for a lightweight, economical replacement part for the machined graphite electrodes used in PEM fuel cells.

Porvair Fuel Cell Technology, a Hendersonville, North Carolina-based company, has licensed the patented technology from ORNL. Porvair is interested in very large-scale production of the plates—in excess of 1 million per year.

Anyone who relies on motor vehicles stands to benefit from this technology. In addition, businesses seeking their own stationary power generators will benefit when low-cost PEM fuel cells become available.

Contact: Dr. Theodore Besmann, (865) 574-6952, besmanntm@ornl.gov



From left: Dr. James Klett, Dr. Theodore Besmann, Dr. Timothy Burchell, and John Henry, Jr.

Automated Image Retrieval for Semiconductor Yield Improvement

Department of Energy
Oak Ridge National Laboratory

A team of researchers at Oak Ridge National Laboratory (ORNL) developed the capability for a flexible content-based image retrieval technology and software system called Automated Image Retrieval (AIR). This patented technology is used to facilitate the use, reuse, and management of the hundreds of thousands of images maintained in semiconductor wafer manufacturing environments.

The technology was invented under an ORNL seed money effort and licensed to Applied Materials, Inc. of Santa Clara, California, for integration into its Defect Source Identifier™—Automated Image Retrieval software product (DSI™-AIR).

The semiconductor industry can achieve significant economic and energy gains by improvements in the device yield brought about by the use of the DSI™-AIR system. The semiconductor industry is worth about \$350 billion per year to the U.S. economy. Therefore, a modest yield improvement of 0.1% could be worth on the order of several hundred million dollars to the economy.

Contact: Dr. Kenneth Tobin, (865) 574-8521, tobinkwjr@ornl.gov



Front row from left: Bobby Whitus, Regina Ferrell, and Kenneth Tobin
Back row: Bruce Jatko, Thomas Karnowski, Shaun Gleason

Acoustic Inspection Device

Department of Energy
Pacific Northwest National Laboratory

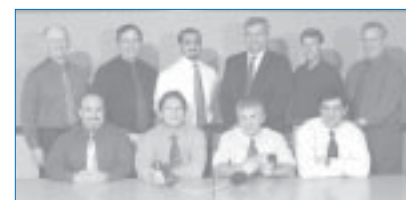
Since the terrorist attacks of September 11, 2001, detecting and preventing hidden contraband and weapons of mass destruction from entering through American borders is now a high priority. A team of scientists and engineers from Pacific Northwest National Laboratory (PNNL) is helping to solve this problem by developing the Acoustic Inspection Device (AID), which provides noninvasive examination of sealed containers and helps screen bulk solids.

The AID rapidly and reliably discriminates and identifies liquid contents in the sealed containers; determines if there are concealed compartments within the containers; and detects hidden compartments in solid forms that may contain contraband.

The PNNL team transferred the technology through a licensing agreement to Mehls, Griffin & Bartek Ltd. (MGB Ltd.), an Arlington, Virginia-based company.

In addition, the U.S. Customs Service provided funding to further develop the technology. MGB Ltd. is currently customizing the AID for the Customs Service, which will be a prime user of the technology.

AID will reduce the amount of time trucks and ships must spend at U.S. border crossings. **Contact: Aaron Diaz, (509) 375-2606, Aaron.Diaz@pnl.gov**



Acoustic Inspection Device Team

EMAdvantage

Department of Energy
Pacific Northwest National Laboratory

In an emergency, getting the right information to the right people in time to make the right decisions can save lives and property. A team from Pacific Northwest National Laboratory (PNNL) has developed an emergency management software system that accomplishes that goal. Emergency Management Advantage (EMAdvantage) is a software tool that simultaneously supports planning, daily operations, incident identification, emergency declaration, and emergency response activities for multiple users within an emergency operations center. Combining real-time modeling, visualization, and communications capabilities, EMAdvantage enables emergency managers to identify hazards, perform threat and risk analysis, declare emergencies, execute and track responses, register and reunite evacuees, and implement protective action decisions.

This technology has been transferred to Petroleos Mexicanos, which manages the national petroleum industry in Mexico; Aptec Microsystems, Inc.; NASA; and the U.S. Army. The transfer process involved software engineering, collaborative tools, copyrights, and licensing.

Contact: W. David Millard, (509) 375-2947, Dave.Millard@pnl.gov



From left: David Millard, Blanche Wood, and Kelvin Soldat

Engine Exhaust Aftertreatment System Based on Non-thermal Plasma-Assisted Catalysis

Department of Energy
Pacific Northwest National Laboratory

A team at Pacific Northwest National Laboratory (PNNL), with the assistance of industry partners, developed an exhaust aftertreatment system for lean-burn diesel and gasoline engines based on non-thermal plasma (NTP)-assisted catalysis.

This system converts harmful nitrous oxides and particulate matter emitted from vehicle engines into clean air components. The technology performs well in the lean-burn conditions of energy-efficient diesel engines, in which conventional three-way catalytic converters are inadequate.

Through CRADAs, the PNNL team transferred the technology to numerous companies, including Ford Motor Company, General Motors, DaimlerChrysler, Caterpillar, Inc., and Delphi Corporation. To date, a full-scale prototype of the system has been installed on a PSA Peugeot 206 environmental technologies demonstration vehicle.

There is a renewed interest in the U.S. reducing its dependence on foreign oil. The exhaust aftertreatment system will enable vehicles of the future to use more efficient diesel engines.

Contact: Darrell Herling, (509) 376-3892, Darrell.Herling@pnl.gov



Engine Exhaust Aftertreatment System Team

Gun Shot Residue Kit

Department of Energy
Sandia National Laboratories

A team from Sandia National Laboratories (SNL), in collaboration with Law Enforcement Technologies (LET), has developed a field test kit that allows law enforcement officers to quickly test a shooting suspect for gunpowder residue. The Gun Shot Residue Kit uses a chemical detection technique that can identify minute traces of residue left at a crime scene—and on the shooter's hands, arms, and clothing. Each kit includes a round fiberglass swab that can be rubbed on the suspected shooter. When the swab is soaked in a unique liquid chemical, spots where gunpowder residue are present will turn blue against the white swab. Producing results in less than five minutes, the kit can detect residues even if the suspect washed his hands after firing the gun.

The technology was conceived jointly between SNL and LET, with LET providing 100 percent of the financing. In addition, LET has licensed the kit for commercial production and distribution. SNL provided additional

product engineering to meet military and law enforcement community requirements by customizing the technology to meet its specific needs.

Contact: Philip Rodacy, (505) 844-1665, pjrodac@sandia.gov



From left: Kevin McMahon, Pam Walker, Susan Bender, Phil Rodacy

Risk Assessment Methodologies

Department of Energy
Sandia National Laboratories

A team from Sandia National Laboratories (SNL) has developed risk assessment methodologies (RAM) for use in protecting America's infrastructure from potential terrorist threats. The methodologies identify risks and vulnerabilities, and then aid in designing technology solutions to effectively manage the situation. This includes characterization of a facility; evaluation of consequences if the facility is attacked; definition of potential adversaries, their motives and resources; quantification of risk; detailed analysis of a facility's vulnerabilities; and a cost-benefit analysis of possible upgrade requirements.

Responding to an urgent need to get this technology out in a timely yet controlled fashion, the SNL team developed a unique licensing strategy.

They not only directly licensed interested parties, they also conducted "train the trainer" seminars at which leading consulting firms were not only trained and licensed to use and apply the technology, but also given the incentive to identify and qualify third-party sublicensees.

To date, SNL has executed 80 licenses for RAM, and more are in process.

As a result of the SNL team's efforts, many infrastructure facilities have an increased awareness of potential vulnerabilities and are now taking steps to manage and mitigate risks.

By taking these steps, the owners and operators of infrastructure facilities are helping to ensure that America and its citizens continue to prosper, even in uncertain times.

Contact: Jeffrey Danneels, (505) 284-3897, jjdanne@sandia.gov



From left: Kevin McMahon, Linda McNeil, Bill Paulus, Betty Biringer, Jeff Danneels, Teresa Torres

Compressed Symbology for Direct Parts Marking

National Aeronautics and Space Administration
George C. Marshall Space Flight Center

Each year, NASA must track millions of parts, even tiny electrical parts no larger than a dime. While the use of bar code labels has saved NASA millions of dollars annually, the labels did not work well on small parts. Compressed Symbology is a term that describes the marking of a permanent matrix bar code symbol directly on the surface of a part. The code can then be read with a charged couple device scanner similar to laser scanners in grocery stores. This two-dimensional symbol marking system, developed by **Harry Schramm**, addresses the inherent need in the aerospace industry for parts tracking.

The evolution of the technology is the result of partnerships with eight commercial partners, including CiMatrix and its parent company, Robotic Vision Systems, Inc. In the agreements, NASA provided parts and materials, while its partners provided labor and expertise. To date, the technology has been successfully applied to more than 80 different materials, including metal, plastics, paper, fabric, and ceramics. The Compressed Symbology technology was inducted into the Space Foundation Hall of Fame in 2001.

The primary benefit of this technology is the elimination of paper bar code labels that fall off or cease to function. Because the marking is permanent, identification information can be read accurately for the life of a part. Compressed Symbology will ultimately have a broad customer base in numerous industries, including automobiles, aviation, and defense.

Contact: Harry Schramm, (256) 544-0823, fred.schramm@msfc.nasa.gov



Harry Schramm

FLC Service Awards

Harold Metcalf Award



Dr. Mike Sullivan

Presented to FLC Representative **Dr. Michael Sullivan** of the Department of Defense, U.S. Navy, **Naval Air Warfare Center-Weapons Division, Point Mugu** for sustained significant service to the FLC as an organization.

Dr. Sullivan is the Head of the Technology Development Projects Office and the Office of Research and Technology Applications (ORTA), positions he has held for over ten years. He also is serving in the following capacities: FLC Far West Deputy Regional Coordinator and Member-at-Large, the FLC Executive Board, Department of Defense (DOD) Technology Transfer Policy Committee Chair, and DOD Technology Transfer Integrated Planning Team (TTIPT) committee member. Additionally, he has served as a member of the FLC Executive Committee and led the Far West Region as and Regional Coordinator. Dr. Sullivan has been a member of the Planning and Policy, Finance, Program, Training, and Legal Committees, and has recently volunteered for the Marketing Committee.

Presented to the FLC Representative who has made the most significant contribution to the FLC program in 2002, this year's winner is **Lynn Murray** of the Department of Transportation's (DOT) **Volpe National Transportation Systems Center**.



Lynn Murray

In her technology outreach role, she serves as an Executive Board member and Chair of the Education and Training Committee for the FLC, as chair of the U.S. Department of Transportation's DOT Technology and Innovation Committee, and DOT representative to the Interagency Working Group on Technology Transfer. She has responsibility for DOT's Small Business Innovation Research program and was President-elect and a board member of the Association for Federal Technology Transfer Excellence.

Lynn is currently investigating methods for the FLC to provide on site presentations of its T² fundamentals and advanced training courses at laboratories throughout the country.

Outstanding Service Award

Presented to a non-FLC Laboratory Representative or alternate for a notable contribution to the FLC in terms of sustained support and/or service, this year's awardee is **Joan Miller** of the **National Technology Transfer Center**.



Joan Miller

Joan has been a longtime supporter of the FLC. She was instrumental in the reinvigoration of the Education Committee.

Joan worked closely with the chair of the Education Committee to develop a new concept and design for *EduLink*, now an integral part of *FLC NewsLink*.

At the FLC national meeting in Burlington, Vt., she moderated several panels on the topic of Professional Education and Training in Technology Transfer. She later disseminated a report based on input received at these workshops.

This material later became important in determining the priorities and the direction of the new Education and Training Committee.

Joan also worked to revamp the Fundamentals Handbook, now called the FLC Technology Transfer Desk Reference.

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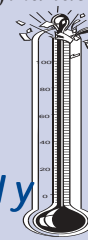
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