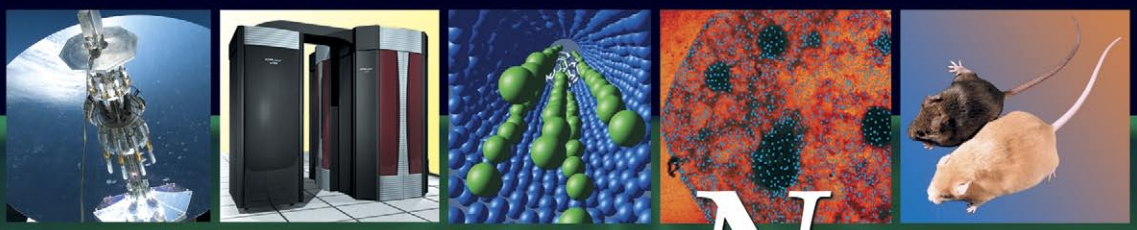
TECHNOLOGY TRANSFER
AND ECONOMIC DEVELOPMENT

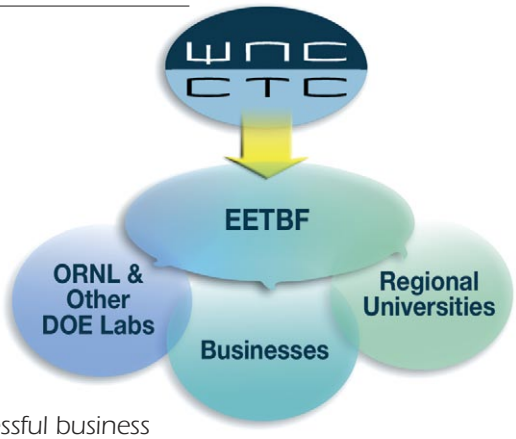


Putting Science to Work

WINTER 2005
Newsletter

BUILDING
ECONOMIC DEVELOPMENT

TTED Participates in Western NC Business Fair



On January 25, 2005, the Western North Carolina Center for Technology Commercialization (WNCCTC) hosted the region's first Energy Efficiency Technology & Business Fair (EETBF) on the Enka Campus of Asheville-Buncombe Technical Community College. ORNL partnered with WNCCTC in organizing this successful business fair, attended by more than 100 persons, including representatives from more than 50 companies across six states.

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ORNL to Collaborate with Mississippi Universities

TTED's Tom Ballard participated in establishing ORNL-Mississippi collaborations.

An initial discussion about ways that Mississippi universities could take advantage of an ORNL–Tennessee Valley Authority agreement to make TVA's fiber-optic networks available for research communications (see the Summer 2004 issue of this newsletter) has blossomed into a range of collaborations.

"We started out talking about the possibility of expanding an arrangement to light up TVA's 'dark fiber' so that the four Mississippi research universities could connect to ORNL," said TTED director Alex Fischer. "Through a series of meetings in Mississippi and Oak Ridge, we have identified a number of initiatives that bring to life the fact that ORNL is the South's federal lab."

Discussions began when TVA chairman Glenn McCullough arranged for a group of Mississippi higher education and economic development officials to visit Oak Ridge in July. Later that month, Fischer and Tom Ballard, TTED's director of economic development and partnerships, traveled to Starkville, Mississippi,

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In This Issue:

ORNL Technology Transfer & Economic Development (TTED) seeks to foster economic development and the growth of business and industry by making available the most innovative equipment, the latest technology, and the expertise of ORNL researchers to technology-based companies throughout the nation.

MESSAGE FROM THE DIRECTOR

Fans of the book *Good to Great* will recognize the philosophy of "getting the right team on the bus." It is a philosophy that our organization is practicing as we add new members to our team. This newsletter contains profiles of two new additions to the TTED staff, Pat Richardson, a former executive with the Motorola Corporation, and Brett Bosley, formerly with the Pittsburgh Supercomputing Center and several venture-backed technology companies. Along with our new director of technology transfer, Casey Porto, from Case Western Reserve and Carnegie Mellon, these talented individuals have chosen to relocate to East Tennessee to work at the nation's greatest national laboratory. They join a strong team of professionals with experience, success, and national reputations in their own right. Collectively, we at TTED are building a very strong team to board the bus!

Presentation of check at "Every School a Great School" event held at the Knoxville Convention Center.

As we think about economic development, most would agree that our region's largest challenges are those that are far upstream from the business of company and job creation: building a strong workforce that can meet the scientific and technical needs of a changing economy. It's an old and perhaps overused caution, but worth restating: The days of an economy driven by low-cost, low-skilled labor are gone. The transition to a knowledge-based economy accelerates the need to focus on the workforce requirements of the 21st century.

Our corporate parents, the University of Tennessee and Battelle, have strong commitments in this arena. The University of Tennessee has a more obvious impact, since its role is to build a workforce that will ensure that Tennessee can compete economically in the future. The original mission of the not-for-profit Battelle Memorial Institute, which 75 years later forms our current mission, was, in part, to "further the scientific and technical education of men and women." The partnership of these two institutions is unique in many ways, but none is more important than the common commitment to education.

Two recent significant investments by UT-Battelle reflect our commitment to enhancing the workforce of the future. UT-Battelle's leadership and investment in the effort to modernize Oak Ridge High School and our recent commitment to the Every School a Great School effort in Knoxville and Knox County combine with our efforts to modernize high school science laboratories throughout the region and state. At the end of the day, there is no more important economic development investment that we can make!

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Western NC Business Fair (cont.)

The event showcased nearly 350 energy-efficient technologies from ORNL, two other Department of Energy laboratories (Pacific Northwest and the National Renewable Energy Laboratory), and four regional universities (Clemson, Tennessee, South Carolina, and Virginia Tech). The full-day program was designed to link entrepreneurs, inventors, and existing businesses with individuals and organizations to assist in commercializing leading-edge energy-efficient technologies.

Speakers from ORNL were Terry Payne, TTED's economic development director, who talked about the impetus that new technology can give to economic development, and Larry Dickens, one of TTED's commercialization managers, who explained how the technology transfer process works. In addition, ORNL researchers Vinod Sikka, Jeff Christian, and Jim Hardy gave presentations on ORNL-developed technologies ranging from a frostless heat pump to a new stainless steel for high-temperature industrial environments.

Jeff Christian of ORNL's Buildings Technology Center was one of the speakers at the recent EETBF.

WNCCTC is a DOE-funded partnership with ORNL and other organizations that is designed to help create jobs in western North Carolina by connecting intellectual property and ideas with people and organizations that can commercialize those resources.

Mississippi Universities (cont.)

where they talked with a much larger delegation about possible collaborations. One of the areas of interest was the connection to ORNL over the unused fiber-optic lines that form part of TVA's transmission system.

Over the next several months, Ballard made several trips to Mississippi to meet with officials of the Mississippi Technology Alliance (MTA) and the Mississippi Development Authority and participated in a number of technology-focused conferences. Another delegation from Mississippi visited ORNL in November.

"We found a group of kindred spirits in the Magnolia state," Ballard said. "They are interested in finding companies to license our technologies and, at the same time, promoting linkages between the four research universities and ORNL. Mississippi also has some special capabilities that might help with some TTED projects."

Among the results of these discussions are an upcoming "ORNL Day" in Jackson with the Mississippi Research Consortium and a possible joint project involving Mississippi State University and Battelle Memorial Institute that was first identified by MTA.

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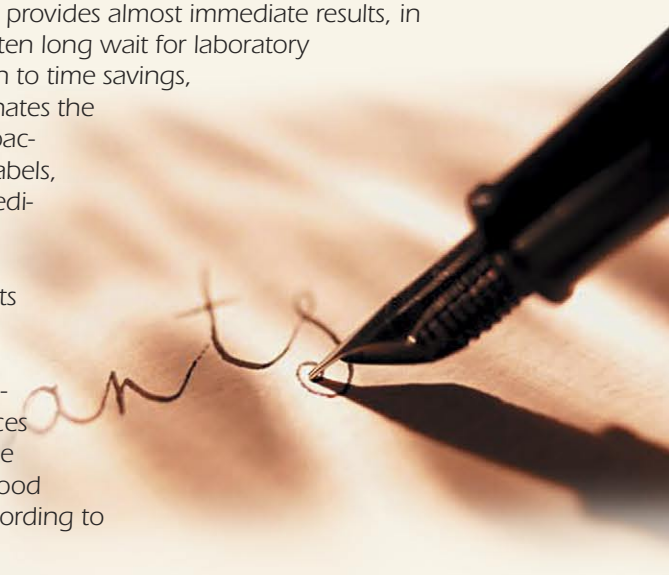
OUR
TECHNOLOGIES

ORNL Signs New License Agreements

Nanodetection Technology, LLC

ORNL's integrated circuit biochip has recently been licensed to a local start-up company, Nanodetection Technology, LLC (www.nanodetectiontechnology.com), for use in the fields of food safety and veterinary medicine. The biochip, which received an R&D 100 Award, is a gene probe–based biosensor that combines the specificity of biological recognition probes and the sensitivity of laser-based optical detection. The technology is currently licensed to Healthspex, Inc., for human medical diagnostic applications.

This DNA biochip provides almost immediate results, in contrast to the often long wait for laboratory results. In addition to time savings, the biochip eliminates the need to use radioactive materials as labels, common in many medical tests. This greatly reduces cost and potential health effects to technicians and lab workers handling samples and performing tests. It also reduces disposal costs because chemically labeled blood must be handled according to strict regulations.



Femtogen, LLC

ORNL's patented high-throughput microcantilever detector has been licensed to Femtogen, LLC, a start-up company in St. Louis, Missouri. The technology combines conventional biological micro-array and microcantilever sensor techniques to provide simplicity of both apparatus and method. The arrays are made in the same way as those used in conventional techniques except that there is no need for tagging the targets with fluorescent dyes. This "scanning probe" device works similarly to a magnetic read head in a computer hard drive. Femtogen is a client of the ORNL/Tech 2020 Center for Entrepreneurial Growth (www.tech2020.org).

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FOCUS ON TTED

TTED Launches New Web Site

TTED has a new web site. We have revised the site to provide users with the information they need to pursue commercialization of ORNL technologies and/or joint technology development opportunities.

Users interested in commercialization will find a list and descriptions of patented ORNL technologies available for licensing. The available technologies are categorized by area, and links are provided to the commercialization manager (CM) responsible for each technology area. For those interested in joint technology development, the Collaborations & Sponsored Research section of the site provides an overview of joint research with ORNL as well as specifics on technology transfer contract mechanisms. The Economic Development area provides information on ORNL's role in technical assistance, SBIR support, venture capital opportunities, and various economic development partnerships.

Also provided are news articles, lists of upcoming events, links to past issues of the TTED newsletter, photos, and online sign-ups for paper copies of the newsletter. Come visit us at http://www.ornl.gov/tted!

PEOPLE AND EVENTS IN TTED NEWS

Management Changes in TTED

TTED director Alex Fischer recently announced a fine-tuning of the organization's management team following the retirement of Joyce Shepherd, director of sponsored programs and management system integration.

Under the new arrangement, Fischer has assumed responsibility for the areas that fall under ORNL's internal standards-based management system. Responsibility for Work for Others (WFO) agreements, Cooperative Research and Development Agreements (CRADAs), and Non-Disclosure Agreements (NDAs) has been transferred to Casey Porto, whose title has been changed to director of technology transfer.

Fischer also announced the creation of the new position of director of industrial relationships and strategic planning. Former Motorola vice president Pat Richardson (see next article) will fill this position and focus on coordinating market and business intelligence that supports commercialization efforts, building strategic alliances with key private-sector organizations that are potential funded research and licensing partners, and integrating TTED's commercialization efforts with the Laboratory's research agenda.

Other members of the TTED management team are Tom Ballard, director of economic development and partnerships, and Christy Griffith, director of finance and administration. Their duties remain the same.

New TTED Staff

Pat Richardson and Brett Bosley recently joined the Technology Transfer and Economic Development team in key positions.

Richardson, who retired in 2002 as vice president of Motorola's Advanced Design and Technology Center, assumes a new position as director of industrial relationships

Pat Richardson

and strategic planning. Bosley, who has been vice president for marketing and commercial development for Fluorous Technologies in Pittsburgh, fills the commercialization manager vacancy in ORNL's Computing and Computational Sciences directorate.

Richardson served most recently as an associate in Emerging Leadership Partners, a Chicago-based consulting group. He is also a former member of the board of directors of Technology 2020 in Oak Ridge. Richardson earned a B.S. in mechanical engineering from the University of Alabama and an M.S. in mechanical engineering from Purdue University.

Brett Bosley

Prior to joining Fluorous Technologies, Bosley spent eight years at Mine Safety Appliances, where he served as finance manager and later as general manager of MSA's Callery Chemical division. He started his career as a computer programmer in the Marine Corps, as part of one of the first-ever development programs to integrate computer data and communications in the C3I infrastructure. Bosley holds a B.S. in computer science from National University and an M.B.A. in finance from Carnegie Mellon University.

"Pat and Brett bring unique capabilities to our team," said Alex Fischer, TTED director. "Pat's nearly 25 years with Motorola, a technology giant, will help us better link industry needs and ORNL capabilities. His experience developing technology roadmaps will also provide us with a unique asset in bridging our commercialization efforts with those of our research directorates. Brett's experience at the Pittsburgh Supercomputer Center and his involvement with several venture-backed start-up companies will be invaluable as we capitalize on opportunities coming from the world's fastest computing capability."

(PEOPLE AND EVENTS continued on page 6)

(BUILDING ECONOMIC DEVELOPMENT continued from page 3)

ORNL Proximity a Factor in Tennessee Site for New Manufacturing Facility

Basalt Specialty Products, a privately held company based in Elkin, N.C., announced on February 4 that it will open a new manufacturing facility in Bristol, Tennessee, later this year. The facility will employ about 46 workers in the first year and more than double that number within three years. The company's decision to locate in Bristol represents an initial investment of $2–3 million in its first year of operation and $1–1.5 million per year over the next two to five years.

According to Matt Kisber, Tennessee's economic and community development commissioner, one of the factors that influenced the company's decision to open a facility in Bristol is access to the resources of ORNL. TTED staff hosted Basalt's president and other company representatives on a tour of ORNL in December 2004.

Basalt Specialty Products produces continuous filament basalt (CFB). Basalt is a hard, black volcanic rock and is the most common rock type in the earth's crust. After this once molten rock is melted to form CFB, the multiple filaments can be twisted into a yarn, piled into a multi-strand roving, or chopped to a fixed length for production of the a non-woven mat.

The marketing opportunities for basalt fiber and insulation blankets in the industrial markets are numerous. CFB can also be used in applications that currently use fiberglass, ceramic fibers, or asbestos replacement materials. CFB manufacturing differs from fiberglass in that it does not require material blending or the air pollution control equipment needed for handling raw materials.

Kisber noted that Basalt's expansion to Tennessee brings with it highly technical, good-paying jobs. He added: "Bringing a new company and a new technology with the opportunity for significant future growth to this area is exciting. [Basalt is] looking to access the resources of the Oak Ridge National Laboratory and some of the local universities as well."

(OUR TECHNOLOGIES continued from page 3)

High-Strength Undiffused Permanent Magnet Motor

ORNL has extensive experience in motor technologies, with 12 U.S. patents for advanced motor technologies in the last 10 years. The high-strength, undiffused permanent magnet (HSUPM) motor is one of ORNL's newest entries in advanced hybrid motor design.

For a hybrid electric vehicle, the engine, the motor, and the generator are coupled together to produce the needed torque for the wheels at various desired speeds without gear shifting, to operate the engine at its most efficient speed, and to recover the wasted energy during downhill or braking situations through electricity generation and storage.

In the HSUPM machine the motor and the generator are combined in one machine with two rotors, an uncluttered rotor and a permanent magnet (PM) rotor. The two rotors and the engine are coupled to a planetary gear set. The PM rotor and the armature form one machine while the uncluttered rotor with the PM rotor forms a second machine. As the armature drives the PM rotor to produce torque to drive the wheels, the uncluttered rotor can also drive the PM rotor for a higher wheel torque. The uncluttered rotor sees a reaction torque that further increases the wheel torque via gears.

While the HSUPM motor is in the early stages of development, the operational concept of its major components has been proven experimentally. A patent is pending, and the technology is available for licensing.

(OUR TECHNOLOGIES continued on page 7)

With the HSUPM, the uncluttered rotor will provide higher wheel torque.

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Brother International Corporation Visits ORNL

Three representatives of the R&D Group of Brother International Corporation visited ORNL on February 2 for briefings on partnership opportunities and ORNL capabilities. The visit resulted from TTED's involvement in economic development activities in the mid-South region through the FedEx Institute of Technology on the campus of the University of Memphis.

Brother International Corporation, headquartered in Nagoya, Japan, has major operations in New Jersey and a 1.5-million-ft^2 facility in Bartlett, Tennessee. With 18,000 employees worldwide, Brother produces a variety of products, from sewing machines to office equipment. More information on Brother can be found at www.brother.com.

ORNL Participates in Technology Expo

ORNL was one of 30 organizations and companies participating in the

(OUR TECHNOLOGIES continued from page 6)

seventh annual East Tennessee Technology Expo, sponsored by the Oak Ridge chapter of the American Society for Metals International. The expo, which took place on February 17, included the companies Delp & Associates, which develops laboratory mixers; Technology for Energy Corp., which featured its new miniature X-ray diffraction system at this year's meeting; and BWXT Y-12, which presented its large-chamber scanning electron microscope. ORNL's TTED had an exhibit booth and displayed literature on ORNL's research capabilities.

The goal of the annual meeting, according to ORNL's Vinod Sikka, expo coordinator, is to bring industries together and grow business. "What we've found . . . is that someone will say to someone else [at the expo], 'I've been wanting to use your services, but I didn't know you existed!'"

ORNL Components a Part of New Municipal Security System

ORNL has collaborated with its partners in the Tennessee Valley Corridor Homeland Security Consortium, as well as the U.S. military and private companies, to develop a system that can enhance homeland security. The Total Municipal Awareness System, or T-MAS, is an adaptable situational awareness system that integrates sensors, visualization, communications bridging, automated decision support, and information routing. T-MAS can be used as a standalone operations center, as a node on a network of such centers, or as augmentation to community 911 centers. The system can be either stationary or mobile.

The core technology for T-MAS was developed for military applications by the U.S. Army Space and Missile Defense Command (SMDC) in Huntsville, Alabama, and is being adapted for homeland security by SMDC and Huntsville-based companies Teledyne Solutions, Intergraph, and Quantum Research. ORNL's SensorNet and ORNL licensee NucSafe are providing critical sensor input for T-MAS. In addition, ORNL's LandScan Global Population Data Base will be integrated to assess populations at risk and to develop evacuation and response models.

In its first use, T-MAS is being implemented in a security evaluation and upgrade project at Chattanooga Metropolitan Airport by the National Safe Skies Alliance with support from Consortium partners. If the technology demonstration is successful, T-MAS could find its way into airports nationwide.

Officials pause for a photo op during a briefing on T-MAS at the Tennessee Valley Corridor Summit in Somerset, Kentucky. *From left to right, Dr. Glenn Priddy, Alabama Homeland Security Technical Director; Kentucky Governor Ernie Fletcher; Congressman Hal Rogers (R, KY); Dr. Robin White, Director of the UT/ORNL Center for Homeland Security; and Department of Homeland Security Secretary Tom Ridge.*

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