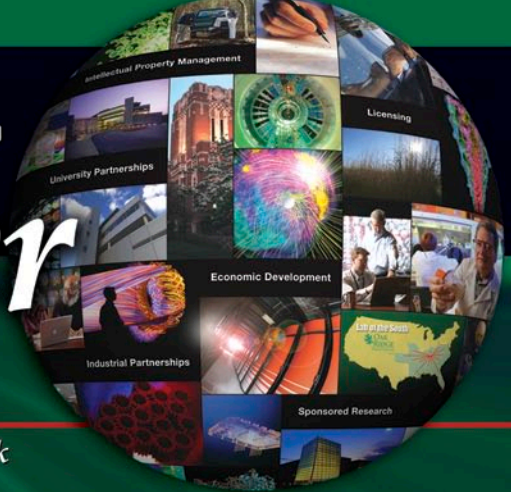


Newsletter

Putting Science to Work



FUNDING IN ACTION

ORNL to Lead Nuclear Energy Innovation Hub

As part of a broad effort to spur innovation and achieve clean energy breakthroughs, a team led by Oak Ridge National Laboratory will receive up to \$122 million over 5 years to establish and operate a new Nuclear Energy Modeling and Simulation Energy Innovation Hub. The award from the U.S. Department of Energy will create the first such hub—the Consortium for Advanced Simulation of Light Water Reactors (CASL for short)—which will be headquartered at ORNL. It will use the advanced capabilities of the world’s most powerful computers to make significant leaps forward in nuclear reactor design and engineering.

The first task will be to develop computer models that simulate nuclear power plant operations, forming a virtual reactor for predictive simulations of light water reactors. Other tasks will include using computer models to reduce capital and operating costs per unit of energy, safely extending the lifetime of existing U.S. reactors, and reducing the volume of nuclear waste generated by enabling higher fuel burnups.

“The Nuclear Energy Innovation Hub is a critical element in our efforts to reestablish American leadership in nuclear energy research and development,” said U.S. Deputy Secretary of Energy Daniel Ponomanov. “We need to rev up the great American innovation machine to find solutions to our energy challenges and promote American competitiveness. With the

(continued on page 3)



Staff from the Partnerships Directorate worked closely with the proposal team that successfully secured the CASL award from DOE and will continue to play an integral role as the proposal is implemented.

Russ Miller, Partnerships’ manager of Strategic Research Alliances, served on the core proposal team in which his primary role focused on engagement of partners and discussion of preliminary intellectual property plans and commercialization strategies. Miller played a similar role several years ago when ORNL successfully competed for a DOE BioEnergy Science Center that was similar in overall scope to the CASL concept.

Working with CASL lead researchers Doug Kothe and Gil Weigand, Miller and Partnerships Director Tom Ballard recruited the Southern States Energy Board (SSEB) to establish a CASL Economic Development, Policy, and Communications Council. This group, which will be chaired by SSEB Executive Director Ken Nemeth, is designed to ensure broad-based understanding about CASL and its implications on public policy and economic development across the South.

Miller retired after the proposal was submitted. Now that implementation is in progress, three staff members from Partnerships are working on finalizing the intellectual property management and commercialization plans. They are Jeff Cornett, Industrial and Economic Development Program manager; Jud Hightower, managing intellectual property attorney; and David Sims, commercialization manager.

“CASL is a great win for the ORNL-led consortium and another opportunity for the Partnerships group to help ensure that the CASL discoveries find their way into the market,” Ballard said.

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MESSAGE FROM THE DIRECTOR



Tom Ballard

Exciting opportunities and announcements continue at Oak Ridge National Laboratory.

Elsewhere in this issue you will read about ORNL being awarded the first of the Department of Energy's new energy innovation hubs, which are patterned after the BioEnergy Science Center ORNL won in 2007. The new hub, officially named the Consortium for Advanced Simulation of Light Water Reactors, draws on the lab's preeminent position as home of the world's most powerful scientific computing complex as well as our long-standing research in nuclear energy.

Former Partnerships staff member Russ Miller, who retired recently, played a key role on the proposal team. Following the announcement of the award and with Miller's departure, a three-person team—Jeff Cornett (lead), Jud Hightower, and David Sims—has assumed the role of developing a comprehensive intellectual property management plan covering all the CASL partners.

You will also read about two new licenses with AMDx and DNP Green. We are pleased that these two companies have licensed technologies developed at ORNL and will make them available in the marketplace.

We are excited about the first year of the Volkswagen Distinguished Scholars Program. Eleven students from three Tennessee universities made up the inaugural class, which spent 10 weeks working with ORNL scientists. The program is funded by Volkswagen and administered by Oak Ridge Associated Universities. One of the highlights for the students and their ORNL mentors was a special tour of the new VW plant under construction in Chattanooga.

Finally, we congratulate Roane State Community College, which recently won a \$2.86 million federal grant to train workers as advanced materials technicians. The training program will be located in the Halcyon Commercialization Center in the Oak Ridge Science and Technology Park at ORNL and help ensure qualified workers for companies in the region that are capitalizing on the lab's technologies.

It continues to be a truly exciting and invigorating time at ORNL.

EDUCATIONAL OUTREACH

VW SCHOLARS

Eleven students from three Tennessee universities compose the inaugural class of VW Scholars participating in a summer internship at ORNL. During their first week at the lab, they were welcomed by Scott Neal Wilson of Volkswagen Group of America, Chattanooga Operations (2nd from r); Marisa Moazen of Oak Ridge Associated Universities (ORAU) (1st from l); and Tom Ballard of ORNL's Partnerships Directorate (2nd from l). The internship program is funded by a 5-year philanthropic gift from Volkswagen to ORNL and administered by ORAU for ORNL.



(EDUCATIONAL OUTREACH continued on page 12)

FUNDING IN ACTION (continued from page 1)

ORNL to Lead Hub *continued*

hubs we are taking a page from America's great industrial laboratories in their heyday and building creative, highly integrated research teams that can accomplish more, faster than researchers working separately."

Specifically, the hub will allow engineers to create a simulation of a currently operating reactor that will act as a virtual model of it. They will then use that virtual model to answer important questions about reactor operations and safety, which will in turn be used to address issues such as reactor power production increases and reactor life and license extensions. The combination of data gained from the virtual model and the physical reactor will be used to resolve technology issues confronting nuclear energy development in the near, mid, and long terms.

Partners in this effort include Idaho National Laboratory, Los Alamos National Laboratory, Sandia National Laboratories,

Massachusetts Institute of Technology, University of Michigan, North Carolina State University, the Electric Power Research Institute, Tennessee Valley Authority, and Westinghouse.

The Nuclear Energy Innovation Hub is one of three hubs that will receive funding in fiscal year 2010. The hubs will be large, multidisciplinary, highly-collaborative teams of scientists and engineers working over a longer timeframe to achieve a specific high-priority goal such as developing fuels from sunlight in an economical way and making buildings more energy efficient. They will be managed by top teams of scientists and engineers with enough resources and authority to move quickly in response to new developments.

More information on the hubs can be found at <http://www.energy.gov/hubs/>.

DOING BUSINESS WITH ORNL

Preventing Blindness Focus of ORNL Technology and AMDx

Automated Medical Diagnostics (AMDx), a startup company based in Memphis, envisions its product helping to preserve the sight of millions of people at risk of vision loss from diabetic retinopathy.

Using Telemedical Retinal Image Analysis and Diagnosis (TRIAD), a technology recently licensed by AMDx from ORNL and the University of Tennessee Health Science Center, patients can quickly be screened for the disease in their primary care doctor's office and other remote sites, permitting early detection and referral for diabetic retinopathy and other retinal diseases.

"If diabetic retinopathy is detected early, treatments can preserve vision and significantly reduce the incidence of debilitating blindness," said Edward Chaum, an ophthalmologist and Plough Foundation professor of retinal diseases at the UT Health Science Center Hamilton Eye Institute in Memphis. Chaum and ORNL's Ken Tobin, who jointly founded AMDx, led the team that developed a method for teaching computers to aid in the diagnosis of blinding eye diseases.

The web-based technology uses a digital camera that takes pictures of the retina at a primary care physician's office or other remote clinical site. The patient's medical data and retinal images are sent to a server and processed through the patented system, which quickly sorts through large databases and finds visually similar images representing equivalent states of diabetic eye disease. This approach allows diagnoses to be made in seconds so patients will know before they leave the office whether they have no eye disease or need to follow up with a retinal specialist. Conventional techniques require a patient to wait several days to receive results.

"With the TRIAD network, all of the computed diagnoses are sent to an ophthalmologist for review and sign-off of the

computer-generated report, much like what is done for an EKG," Tobin said. "Over time, our hope is that the number of reports requiring physician review will be reduced as the performance of the TRIAD network is proven through clinical testing."

"Today, less than half of Americans known to be diabetic receive the recommended yearly examination because they either cannot afford eye exams, lack access to eye care providers, or are unable to comply with physicians' recommendations," Chaum said. "In the next 15 years we will need to be able to screen more than 1 million patients every day worldwide in order to detect and manage vision loss and blindness due to diabetes. By using automated computer-assisted diagnostic methods like TRIAD and the connectivity of the Web throughout the world, this is an achievable goal."

For more information see <http://nanopatentsandinnovations.blogspot.com/2010/05/automated-medical-diagnostics-products.html>.

(DOING BUSINESS WITH ORNL continued on page 10)

ORNL researchers Ken Tobin (left) and Tom Karnowski see TRIAD as something that could be a life-changer for people at risk of diabetic retinopathy and other potentially blinding diseases. (Photo by Ron Walli/ORNL)



REGIONAL PARTNERSHIPS NEWS

Solar Technologies Showcased at Third Halcyon Days Event

The Partnerships Directorate hosted its third Halcyon Days event on June 10 at the Halcyon Commercialization Center in the ORNL Science and Technology (S&T) Park. Halcyon Days takes place quarterly and brings together current S&T Park tenants, ORNL researchers and staff, and area business people and entrepreneurs. Previous events focused on ORNL's Industrial Technologies Program and carbon fiber technology. Each ends with a tour of the ORNL facilities associated with the day's technology focus.

The June event highlighted solar energy technology. Chad Duty, Solar Technologies Program manager at ORNL, led off the day with an update of ORNL activity in this area, including a \$3.5 million research effort he leads for DOE's Industrial Technologies Program.



Next, Stacey Patterson, director of Research Partnerships at the University of Tennessee, gave a presentation about the Volunteer State Solar Initiative, which includes the West Tennessee Solar Farm and the Tennessee Solar Institute (TSI). The farm is a \$31 million, 5-megawatt utility-scale installation located near Brownsville. TSI is a \$29.2 million

UT-ORNL initiative that aims to enhance value and provide assistance to Tennessee's solar industry and will administer and coordinate the Solar Installation and Solar Innovation grant programs. More information on these programs can be found at <http://solar.tennessee.edu>.

Finally, Harvey Abouelata, vice president of sales and marketing at Efficient Energy of Tennessee (EETN), gave an overview of the solar energy market and EETN's operations. EETN, located in Powell, provides sustainable solutions to rising



Chad Duty explains the purpose of the PulseForge on the June 10 Halcyon Days tour of one of the ORNL labs used for solar energy research.

energy demands in Tennessee and the surrounding areas. The company currently specializes in solar photovoltaic design and installation as well as power factor correction technology for both residential and commercial customers. You can read more about EETN at <http://eetenn.com>.

The next Halcyon Days event will take place on September 23, 2010, at 7:30 a.m. in the Halcyon Commercialization Center. Please be sure to join us.

(REGIONAL PARTNERSHIPS NEWS continued on page 9)



The Halcyon Commercialization Center is the site of the quarterly Halcyon Days events, which bring together current S&T Park tenants, ORNL researchers and staff, and area business people and entrepreneurs. It will also be home to the Advanced Materials Training and Education Center, at which a Community-Based Job Training Grant from the U.S. Department of Labor will fund a program to prepare students for technician-level employment in the advanced materials industry.

SPOTLIGHT ON PARTNERSHIPS

NEW ROANE STATE TRAINING CENTER TO BE LOCATED IN S&T PARK

Regional efforts to develop a cluster of activity around advanced materials received a major boost with the announcement of a new \$2.86 million grant to Roane State Community College over the next 3 years, which will support educating workers in advanced materials technician-level training, a field with strong job growth prospects. The school was one of 41 community colleges and organizations nationally, and the only one in Tennessee, to receive a Community-Based Job Training Grant from the U.S. Department of Labor during this round of funding.

“Our strong partnerships with area businesses and organizations made this successful grant possible,” Roane State President Dr. Gary Goff said. “We greatly appreciate their support and look forward to working together to educate workers in this high-demand field.”

Grant partners with Roane State were ORNL; Toho Tenax America, Inc.; CoorsTek, Inc.; Protomet Corporation; USEC, Inc.; Confluence Solar, Inc.; Knoxville–Oak Ridge Innovation Valley; the Tellico Reservoir Development Agency; the Tennessee Solar Energy Association; Tennessee Department of Labor and Workforce Development Local Workforce Investment Areas 3 and 4; the Community Reuse Organization of East Tennessee (CROET); Ametek, Inc.;

and Babcock & Wilcox. Combined these organizations are committing \$562,955 worth of resources and services to the project.

These partners have identified the need to train and hire more than 1,200 new advanced materials technicians during the next 3 years. The grant includes funds for tuition and other costs for more than 600 unemployed individuals to complete such training.

The grant will also fund the Advanced Materials Training and Education Center (AMTEC) in Oak Ridge, which will offer a 4-month curriculum. Participants who complete the training will be qualified for technician-level employment in the advanced materials industry.

“The AMTEC’s initial focus will be work in carbon fiber and solar energy,” said Dr. Lou Rabinowitz, Roane State director of workforce connections. “The project also lays the groundwork for emerging advanced materials workforce needs, including nanotechnology, nuclear energy, battery storage, and more. For those seeking high-tech, good-paying jobs, the AMTEC will be a tremendous resource for years to come. Entry-level wages in this field are \$20 or more per hour.”

CROET will provide classroom facilities for the AMTEC in the Halcyon Commercialization Center at ORNL. The grant will pay for three staff positions, faculty, training equipment, computers, office supplies, software, and other needs.

“In this tough economy, jobs are of the utmost importance,” said U.S. Representative Lincoln Davis. “This major investment in the area’s workforce will be an asset in helping many people receive



the proper training to land a good-paying job in a high growth sector. I applaud the cooperative efforts of all the partners involved in helping to bring this grant to Tennessee.”

According to the Department of Labor, Community-Based Job Training Grants improve the ability of community colleges to train and prepare workers for employment in high growth and other emerging industries. Over the last 4 years, it has awarded approximately \$622 million to 301 community colleges and other organizations in 49 states. During this round alone it received 323 applications and awarded \$125 million in grants.



Advanced materials training could eventually result in jobs such as this one in which Senior Technician Ronny Lomax of ORNL examines a carbon fiber composite preform.

AWARDS AND RECOGNITION

ORNL RESEARCHERS WIN

Researchers at ORNL were recently honored with eight R&D 100 awards, sometimes referred to as the “Academy Awards of Science,” for development of what *R&D Magazine* considers one of the 100 most technologically significant new products of 2010. This year’s wins bring the total number of R&D 100 awards for ORNL to 156, giving it the most of any DOE laboratory and making it second only to General Electric overall.

- **Telemedical Retinal Image Analysis and Diagnosis**, developed and jointly submitted by Kenneth Tobin, Thomas Karnowski, Luca Giancardo, Deniz Aykac, and Priya Govindasamy of ORNL, Automated Medical Diagnostics, and Edward Chaum and Yaqin Lee of the University of Tennessee Health Science Center.

The TRIAD technology is a Web-based telemedical diagnostic system designed to conduct automated eye screenings of large patient populations for blinding diseases such as diabetic retinopathy in a primary health care setting. The real-time low-cost screening provided by TRIAD can help primary care providers offer a more efficient and economical retina screening service to prevent blindness in diabetic patients. This diagnostic tool will allow far more people to undergo screening, especially the indigent and those in areas that are medically underserved.

- **Liquid Microjunction Surface Sampling Probe for Mass Spectrometry**, developed and submitted by Gary Van Berkel and Vilmos Kertesz of ORNL and Michael Ford of NextGen Services.

The ambient surface sampling system for mass spectrometry uses a sampling probe for quick, efficient liquid extraction of analytes directly from surfaces. The technology’s ability to analyze materials outside a vacuum and under real-world conditions demonstrates a clear improvement over technologies limited to surface sampling within a vacuum. The product’s simplicity, speed, and cost effectiveness allow for a range of uses within the biological sciences, including applications in pharmaceutical research and drug discovery.

- **Sulfur-Carbon Nanocomposite Cathode Material and Additives for Lithium-Sulfur Batteries**, developed and submitted by ORNL’s Chengdu Liang, Nancy Dudney, and Jane Howe.

The technology offers a more functional sulfur-carbon nanocomposite cathode and halide additives to the electrolyte to solve problems inherent in existing lithium-ion battery technology. The lithium-sulfur battery system could improve the energy density of the current technology by a factor of five or more. By enabling a more reliable, safer, and longer-lasting battery system, this invention has the potential to aid in the harnessing, storage, and use of electricity from renewable energy sources.

- **Ultrasensitive Nanomechanical Transducers Based on Nonlinear Resonance**, developed and submitted by ORNL’s Nickolay Lavrik and Panos Datskos.

The technology, based on nonlinear nanomechanical resonators, enables sensitive linear detection of force or mass that can be used in a number of important applications, including chemical and biological detection, inertial navigation, and thermal imaging. It can determine the

presence of extremely low levels (femtogram quantities) of chemicals in a gas or liquid with a sensitivity that is at least 1,000 times better than other comparable mass-sensitive transducers on the market. The new method used in the nonlinear resonator transducers can provide real-time monitoring in a cost-effective manner and can lower detection thresholds in both gas and liquid environments without increasing the cost and complexity of the tool.



EIGHT R&D 100 AWARDS

- *Strontium Iodide Scintillator for Gamma Ray Spectroscopy*, submitted by Lawrence Livermore National Laboratory and developed in conjunction with Lynn Boatner, Joanne Ramey, and James Kolopus of ORNL; Fisk University; Radiation Monitoring Devices, Inc.; and the Department of Homeland Security's Domestic Nuclear Detection Office.

The technology allows for the efficient and precise detection of illicit sources of uranium, plutonium, and other radioactive materials, which can play a critical role in protecting the country from nuclear and radiological threats.

Europium-doped strontium iodide enables the highest-resolution gamma-ray spectroscopy for a scintillator detector to identify radionuclides. This technology's superior scintillator energy resolution and its cost-effective production make it valuable for a number of homeland security and other important applications.

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MSAFM is a novel measurement system for noninvasive high-resolution surface and subsurface characterization and analysis of materials at the nanoscale. This technology can obtain a wealth of material information from both the surface and the subsurface domains, opening almost unlimited opportunities in nanoscience in a variety of endeavors, including human health, environmental studies, toxicology, nanofabrication, cell mechanics, and energy research.

- *High-Performance, High-Tc Superconducting Wires Enabled via Self-assembly of Non-superconducting Columnar Defects*, developed and jointly submitted by SuperPower, Inc.; the University of Houston; the University of Tennessee; and ORNL researchers Amit Goyal, Sung-hun Wee, Eliot Specht, Yanfei Gao, Karren More, Claudia Cantoni, Keith Leonard, Malcolm Stocks, Tolga Aytug, Mariappan Paranthaman, David Christen, Jim Thompson, and Dominic Lee. Further assistance provided by Chonbuk National University.

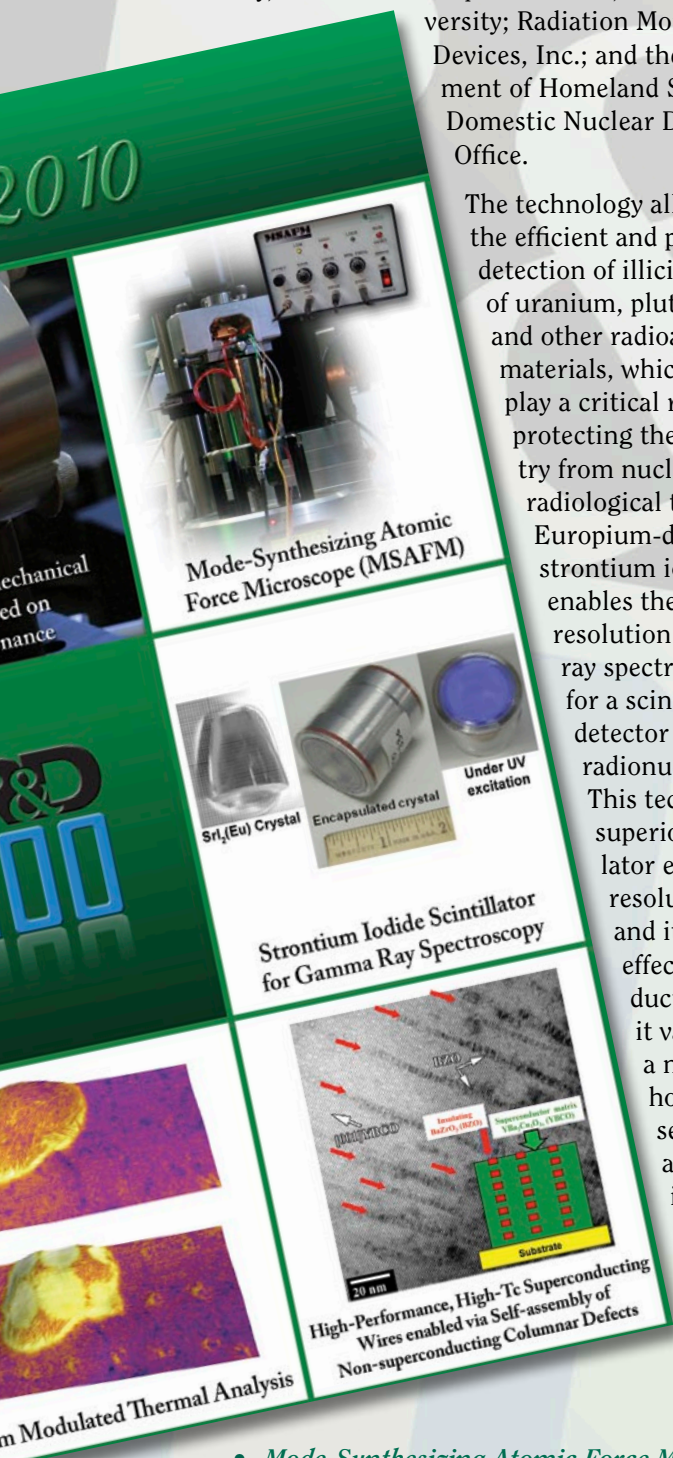
The three-dimensional self-assembly process enables the fabrication of ultra-high-performance superconducting wires. The technology is designed to create nonsuperconducting nanoscale columnar defects with nanoscale spacing within high-temperature superconducting wires. These defects are desirable because they can improve the performance of high-temperature superconductors by enabling large currents to flow through the materials in the presence of high applied magnetic fields. The need for high-temperature superconductors in the electric power, medical, transportation, industrial, and military sectors demonstrates this product's widespread commercial viability and usefulness.

- *Ztherm Modulated Thermal Analysis*, developed and jointly submitted by Asylum Research Company and ORNL researchers Maxim Nikiforov, Sergei Kalinin, and Stephen Jesse.

The technology provides a tool for failure analysis of devices such as electrical conductors or semiconductors in flexible electronic devices and polymer photovoltaic devices, in which polymers play a key role. Ztherm offers highly localized heating with sensitivity to sub-zeptoliter material property change with vast improvements over other commercial systems. It is a powerful method for characterizing the mechanical properties of polymers as a function of temperature with the highest spatial resolution available today.

"Winning eight of these prestigious awards is a testimony to the talent and creativity of a remarkable staff. They do a tremendous job of delivering our mission of scientific discovery and innovation," said ORNL Director Thom Mason.

(AWARDS and RECOGNITION continued on page 8)



- *Mode-Synthesizing Atomic Force Microscope (MSAFM)*, developed and submitted by Ali Passian, Thomas Thundat, and Laurene Tetard of ORNL.

AWARDS AND RECOGNITION (continued from page 7)

ORNL Wins Eisenhower Award for Small Business Support

ORNL's record in using small businesses to meet subcontracting needs recently earned UT-Battelle, LLC, its managing contractor, the 2010 Dwight D. Eisenhower Award for Excellence in the research and development category.

The U.S. Small Business Administration presented the award to Keith Joy, director of ORNL's Small Business Programs Office (SBPO), and Jerome Hicks, director of ORNL's Contracts Division, at a ceremony in Washington, DC, during National Small Business Week.

"Through our small business programs, ORNL staff have worked consistently to serve as a valuable and productive resource to the small business community," Joy said. "By providing advice and technical assistance to businesses interested in working with the Department of Energy, our programs enhance the ability of small businesses to be competitive in the subcontracting market."

In fiscal year 2008, ORNL issued more than \$251 million in subcontracting dollars to small businesses, representing nearly 63 percent of subcontracting expenditures. In fiscal year 2009, small business subcontracting dollars increased to \$257 million.

ORNL's SBPO maintains an active national presence by attending, providing speakers for, and exhibiting at numerous small business conferences throughout the United States. The office also places an emphasis on making time for face-to-face, in-office discussions. In fiscal year 2009, SBPO staff members met with 210 visiting small business representatives.

Created in 1991, the Dwight D. Eisenhower Award for Excellence honors the president who helped create the Small Business



Pictured at the award presentation are (l to r) Bill Valdez, DOE Acting Director of Economic Impact and Diversity; Kathy Collins, ORNL Contracts; Keith Joy, ORNL Small Business Office; DOE Deputy Secretary Daniel Poneman; Brenda DeGraffenreid, DOE; Jerome Hicks, ORNL Contracts; and Cassandra Stuart, ORNL Small Business Office.

Administration. It recognizes outstanding large prime contractors in their use of small businesses as suppliers and contractors in five different categories: manufacturing, service, research and development, construction, and utility. In 2005 ORNL earned the distinction of being the first Office of Science laboratory to win this award.

Other recent honors for ORNL include the 2008 DOE Mentor of the Year Award for improving the capabilities and contracting opportunities of its small business protégés as well as the 2008 DOE Management and Operating Small Business Program Manager of the Year Award.

PARTNERSHIPS INITIATIVES

Carbon Fiber and Composites Consortium Explored by ORNL

Efforts are under way to organize an Oak Ridge carbon fiber and composites industrial consortium to leverage recent federal investments in this exciting new technology area. Carbon fiber composites can be many times stronger and many times lighter than steel and hold great promise for helping the country improve its energy efficiency, especially in applications such as lighter-weight vehicles. ORNL has been working for more than a decade on new, lower-cost sources of carbon fiber materials and last year received a \$34.7 million American Recovery and Reinvestment Act award to design, construct, and operate a new carbon fiber and composites center. One highlight of this new center will be a pilot plant capable of producing 25 tons of new low-cost carbon fiber materials each year that will be operational in early 2012.

Partnerships staff are meeting with many companies interested in ORNL's efforts in carbon fiber composites, and the need for an industry consortium is growing. Consortium member benefits will include opportunities to serve on an industry advisory board, work with ORNL staff on key technical issues, and provide vitally important feedback to ORNL regarding market-driven technology development and deployment opportunities. For more information about this consortium, contact Tom Rogers at rogerstc@ornl.gov.



Spooled carbon fibers



Innovation Valley Capitalizes on Oak Ridge Technologies

Improved LED lights; high-tech air filtration systems; and lighter, stronger, and easier-to-ship materials—all developed locally—are fueling a promising and increasingly green future for the Knoxville–Oak Ridge Innovation Valley.

Entrepreneurs and local companies in the Innovation Valley economic development region can work closely with researchers at ORNL, the Y-12 National Security Complex, and the University of Tennessee–Knoxville. Concrete examples of the region’s technical and entrepreneurial synergies are easy to find.

LED North America’s Andy Wilhem wants to make LED lights last longer. Using a lightweight carbon foam developed at ORNL that reduces temperatures in LED engines by as much as 10 degrees Celsius, Wilhem says he can double the life of LEDs. That, he argues, could represent an “industry game changer” with an effect most immediately apparent in public LED applications in schools, streets, parking garages, and office buildings.

In another example of Innovation Valley technology at work locally, Knoxville-based Bandit Lites, one of the entertainment world’s largest lighting providers, is gaining a competitive edge by working with GRNLite. The company has developed a full range of rugged, bright, and affordable LED fixtures that reduce onstage heat, use 90 percent less electricity, and reduce truck space, cutting fuel costs and emissions. Bandit Lites is also bringing lightweight carbon fiber stage-rigging systems to the market.

“The progress we’re making with LEDs and carbon fiber materials ties in directly to advances at the Oak Ridge National Lab and at the University of Tennessee,” Strickland says.

Technology transfer is also at work locally at Industrial Ceramic Solutions, which produces ceramic fiber filters for industrial



Participants gathered information and made connections at the first Technology Resource Showcase in June 2010.

and diesel exhaust applications. The company, headed by former Oak Ridge materials research scientist Dick Nixdorf, is developing high-performance reinforcement fibers to improve the durability of combustion chamber liners in coal-fired power plants. Nixdorf’s company also works with carbon nanotubes, which could improve future fuel cells and lithium batteries. The underlying technology was a joint effort by ORNL and Y-12.

The synergies between research and the region’s economy are perhaps best symbolized by ORNL Laboratory Director Thom Mason’s chairmanship of the Knoxville–Oak Ridge Innovation Valley economic development partnership and events like the recent Technology Resource Showcase, which connected local researchers and their innovative technologies with local companies.

“I believe in the adage ‘companies innovate or they die,’” said Jesse Smith, technical director for the Innovation Valley partnership. “We ask companies, why would you want to be anywhere else? What better way than to tap into DOE’s largest energy materials lab and the innovative products coming out of Y-12 and the many collaborative efforts with a major university?”

ORNL to Help Lead New SAMTA Initiative

The Southern Growth Policies Board has announced a new Southern Advanced Materials in Transportation Alliance (SAMTA) and asked ORNL to serve as a cochair for the effort.

SAMTA’s goals are to capitalize on key Southern assets to increase investment in research and development, production capacity, and employment in the realm of advanced materials. When making its announcement, Southern Growth cited several key regional strengths in advanced materials and transportation sectors, including

- the South’s leadership position in automotive production,
- the impressive automotive transportation research assets in the region,

- an increased focus on aerospace in several Southern states, and



- ORNL’s leadership position in materials research.

Tom Rogers, director of Industrial and Economic Development Partnerships at ORNL, has agreed to serve as the public-sector cochair for this new 2-year strategic effort. Each of Southern Growth’s 15 member states will appoint a representative from both the public and private sectors to serve on the SAMTA steering committee, which is being funded by a grant from the U.S. Department of Commerce’s Economic Development Administration.

DOING BUSINESS WITH ORNL (continued from page 3)



NIST Funds Research in Greener Steel Coating Using ORNL Technology

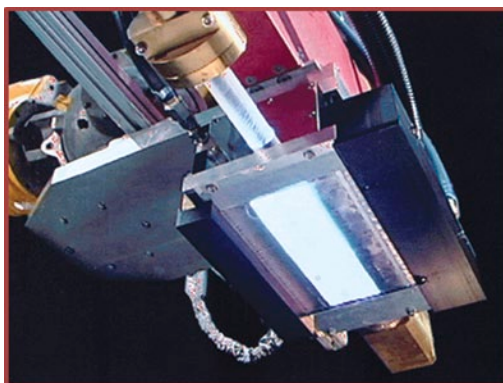


A team of three American companies has been awarded \$1.79 million from the National Institute of Standards and Technology (NIST) to create a new way to coat steel faster, cheaper, and greener, and the technology at the center of the process was developed at ORNL.

Ohio-based MesoCoat, Inc., has been chosen to lead the project and is working with The Edison Materials Technology Center and Seattle-based Polythermics, LLC, to create a new coating technology. It will use a high-intensity infrared light source to bond nanocomposite metal-ceramic and polymer coatings onto steel surfaces for use in infrastructure projects. The research team is hoping the process will replace the electroplating, chromate primers, hot-dip galvanizing, and fusion-bonded epoxy technologies commonplace today.

Current coating protection systems rely on often hazardous primer materials made of heavy metals coated with organic polymer paint, used as a moisture barrier. Because these coatings are subject to ultraviolet degradation over time,

they must regularly be repaired or replaced. The rehabilitation process often involves stripping the coatings with volatile organic compounds. “We’ve got a more green process that involves less chemicals, so there’s less waste, less material in the air,” said Dr. Greg Engleman, MesoCoat’s chief technical officer.



The MesoCoat FARCoat system allows a coating to be metallurgically bonded to a substrate, offering a low-cost coating tool for large surface areas on a variety of metal substrates.

The cutting-edge high-intensity infrared light technology underlying the process was created at ORNL, where Engleman worked for 9 years.

“This technology takes high-energy density processing methods and allows us to very quickly fuse coatings to the substrate,” he said, noting the ability to go as high as 3,500 watts per square centimeter. “It allows very rapid processing over large areas, which is one of the breakthrough technologies,” he said.

“If you compare it to currently used technologies, which are thermal spray technologies or laser cladding, we have the advantage that we can process a much larger area. Due to the size of the beam that we’re using, we don’t tend to get a whole lot of mixing of the substrate material, which means that we can use less coating material.”

Additionally, the technology increases corrosion resistance because the bonded materials move well with the metals below them. “That gives us the advantage of having these hard particles that have the wear and corrosion resistance in a metal matrix that is more ductile and tough,” Engleman said. “So, we really have the ability to tailor these materials to a particular application.”

For more information see <http://www.mesocoat.com>.

PartTec and ORNL Sign Licensing Agreement



Representatives from ORNL and PartTec, an Indiana-based firm that provides scientific research and advanced manufacturing services, formally signed a licensing agreement Thursday, August 12, 2010, to market an advanced neutron detector system developed for the Spallation Neutron Source. This system—developed by Rick Riedel, Lloyd Clonts, and Jason Hodges of ORNL’s Neutron Scattering Science Division and Ron Cooper, Lowell Crow, John Richards, and Bruce Hannan of ORNL’s Neutron Facilities Development Division—is considered to be the leading candidate to replace helium-3 detectors at neutron scattering facilities throughout the world. Pictured are (front, l to r) ORNL Deputy Director for Science & Technology Thomas Zacharia and PartTec CEO Herschel Workman and (back, l to r) Bruce Hannan, PartTec Production Manager Craig Kline, Rick Riedel, Jason Hodges, and Ron Cooper.

(DOING BUSINESS WITH ORNL continued on page 11)

DOING BUSINESS WITH ORNL (continued from page 10)

DNP Green Receives License for ANL and ORNL Patents

On March 9, 2010, two DOE laboratories, ORNL, managed by UT-Battelle, LLC, and Argonne National Laboratory (ANL), managed by UChicago Argonne, LLC, fully executed an exclusive license agreement with DNP Green Technology for patents related to methods of producing dicarboxylic acids, especially succinic acid. The patent portfolio includes three U.S.-issued patents and the corresponding foreign patents and patent applications. UChicago Argonne is the sole owner of one of these patent families, and the other two patent families are jointly owned by UChicago Argonne and UT-Battelle. The patented methods within this portfolio were invented jointly by Mark

Donnelly and Cynthia Millard of ANL. Nhuan Phu Nghiem of ORNL and/or Lucy Stols of ANL are also named as inventors on some of the patented methods within this portfolio.

DNP Green Technology, a private U.S. renewable-chemistry company, combines biotechnology and catalyst chemistry to create renewable chemicals that can compete in price with petrochemicals. It currently produces renewable succinic acid using agricultural feedstocks and is developing processes for converting succinic acid into value-added products such as deicing solutions,

biodegradable plastics, monomers for polymer chemistry, and ecofriendly solvents, and plasticizers.

At the core of DNP Green's succinic acid platform is an organism developed by DOE in the late 1990s as part of the Alternative Feedstocks Program. This organism has proven to be robust and capable of producing high yields of succinic acid when anaerobically fermented (in the presence of carbon dioxide, as opposed to oxygen).

The company recently commissioned the world's first biobased succinic acid production plant. Located in Pomacle, France, the plant has an initial capacity of 2,000 metric tons. The plant's production process costs less than those used to produce fossil-fuel-derived succinic acid and results in a higher-purity final product that is 100% renewable.

One of the company's objectives in recent years has been to sign technology licenses in North America and Asia so two large-scale succinic acid plants with initial annual capacities of 25,000 and 30,000 metric tons can be operational in 2012. The license agreement with UT-Battelle and UChicago Argonne represents a key step toward making this objective a reality.

For more information visit <http://www.dnpgreen.com>.



DNP
GREEN TECHNOLOGY

SAFETY REMINDER

Preventing Injuries from Frontal Air Bags

Between 1987 and 2008 frontal air bags saved more than 25,000 lives—and injured many drivers and passengers who didn't know how to protect themselves from their explosive force. To optimize your and your passengers' safety in a crash, follow these simple steps:

- Sit upright with your back against the seat and feet on the floor with at least 10 inches between the air bag and your chest.
- Tilt the steering wheel toward your chest instead of your head and neck. Avoid tilting it toward your abdomen if you're pregnant.
- Slightly recline the driver's seat to increase your distance from the steering wheel if you're smaller than average.
- Place children under 13 in an appropriate child restraint system in the rear seat. If you *must* transport a child younger than 13 in the front seat, be sure to turn off the air bag.

Most importantly, remember that air bags *do not replace* properly worn seat belts or child restraint systems. *Always* wear the lap belt snugly *under* the abdomen and low across the hips and make sure the shoulder belt crosses the collarbone and chest, *not* the neck.

For more information, see <http://www.nhtsa.gov/Driving+Safety/Occupant+Protection>.



University Partnerships



Licensing



Intellectual Property



Sponsored Research



Industrial Partnerships



Economic Development

UPCOMING EVENTS

October 13–15

NASVF Annual Conference: Funding Innovation—Accelerating the New Economy, Baltimore, MD.

For more information: www.nasvf.org

October 14–15

Biomass South 2010 Conference, Memphis, TN. For more information:

www.biomasssouth2010.com

October 26–27

Entrepreneurial Imperative 2010, Knoxville, TN. For more information:

www.tech2020.org/event_imperative2010.html

November 21–22

2010 Tennessee Valley Corridor Fall Partnership Event, Huntsville, AL. For more information: www.tennvalleycorridor.org

• MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY •

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For information, questions, and comments, contact us by one of the following: E-mail: partnerships@ornl.gov
Website: www.ornl.gov/partnerships
Toll-free number: 866-221-2527

Electronic Delivery Option

Want to stay in the Partnerships loop while reducing the stack of mail on your desk? Go to our updated website at www.ornl.gov/partnerships to view the newsletter online and sign up to receive it via e-mail.

EDUCATIONAL OUTREACH (continued from page 2)

National Lab Day at ORNL

On May 5, 2010, ORNL invited more than 120 middle school students and science teachers from six Tennessee schools to participate in National Lab Day at the site. National Lab Day is a grassroots movement connecting volunteers, university students, scientists, and educators to bring discovery-based science experiences to students in grades K–12. The goal of the movement is to inspire a new generation of innovators to keep America at the forefront of discovery and scientific advancement.

As part of the National Lab Day activities, visiting students were introduced to scientific experiments in materials science, robotics, supercomputing, plug-in electric vehicles, and forensic anthropology. The students also toured ORNL's Leadership Computing Facility and the Spallation Neutron Source to gain an understanding of how both basic and applied sciences affect their daily lives.

Doug Speight, director of University Partnerships, stated, "It is imperative that the national laboratories and STEM professionals play an active role in mentoring and stimulating the next generation of scientific leaders. Exposing students to science and its effects on our society inspires them to pursue

science, technology, engineering, and mathematical careers, which, in turn, enables the U.S. to remain globally competitive by filling vital workforce pipelines."

Students take a simulated spin through the linear accelerator of the Spallation Neutron Source. The mock-up of the accelerator takes visitors down the path a hydrogen ion would follow from the front end of the accelerator, through the accumulator ring, and all the way to the mercury target.

