

Images provide new tool for developing advanced ceramics

ORNL team sets new electron microscopy record

A team of Condensed Matter Sciences Division researchers has established a world record in electron microscopy, attaining 0.6-angstrom resolution with the 300-kilovolt Z-contrast scanning transmission electron microscope. The team, led by Corporate Fellow Steve Pennycook and including Matt Chisholm, Albina Borisevich and Andy Lupini, eclipsed the Lab's own record of 0.78 angstrom.

Atom-scale images of such a resolution give researchers a leg up on predicting and modeling the properties and behavior of advanced ceramic materials.

A paper in the journal *Nature*, by Pennycook, Gayle Painter and Paul Becher of the Metals & Ceramics Division and visiting researcher Naoya Shibata, illustrated the Z-contrast STEM's advantage in the development of strong and heat-resistant materials.

The work reveals the preferred location of atoms within a silicon nitride ceramic. Where specific atoms reside is key to the properties of the materials. The atom-scale images match, almost exactly, the positions predicted by theoretical calculations.

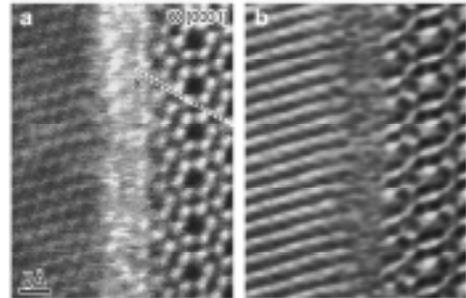
"With this new confidence in our theories, we will, in the near future, model materials on

a computer screen and predict their properties without having to actually fabricate and characterize a large number of samples, which is very expensive and difficult," Pennycook says.

The production of the images of silicon nitride, along with CMSD's record-setting images, was aided by an emerging technology called aberration correction, which uses computer technology to correct errors introduced to the images by imperfections in the electron lenses. Shibata, a fellow of the Japan Society for the Promotion of Science, produced the images, which were then refined with technology provided by Pixon LLC of Setauket, N.Y.

Silicon nitride interests materials researchers because it is strong and lightweight. However, it is also intrinsically brittle, so researchers are constantly searching for ways to make it tougher and less brittle.

One way to toughen the material is to induce the growth of whisker-like grains that act much like reinforcing rods in concrete.



Z-contrast scanning transmission electron microscope image (a) of a grain boundary in lanthanum-doped silicon nitride ceramic clearly shows that the bright lanthanum atoms preferentially segregate to the interfaces between crystal grain and the glassy intergranular film at center. Atoms are not visible in the conventional microscopical image (b). Images such as these match theoretical predictions and are invaluable to researchers developing advanced materials.

Researchers know how to form the whisker-like grains by adding certain rare-earth "doping" agents such as lanthanum oxide.

(See ATOM-SCALE, page 4)

State of Lab 'outstanding,' as ORNL works to be world's best

Offering glimpses of our legacy and future, ORNL Director Jeff Wadsworth told listeners at his first State of the Laboratory presentation that "we intend to be the world's best 21st century lab at what we do."

Declaring that ORNL's history places it among the outstanding labs of the last century, Wadsworth quoted Director Emeritus Alvin Weinberg's 1967 description of a great national lab: One with "a flair for getting after very big and difficult matters."

As he spoke to a near-capacity crowd at the American Museum of Science and Energy, Wadsworth said today's "matters" include compelling national problems in the areas of



ORNL Director Jeff Wadsworth (right) chats with Al Ekkebus of the SNS Experimental Facilities Division before the State of the Lab address.

national security, energy and the environment.

"To address these issues, great laboratories must integrate across several dimensions, beginning with strong intellectual foundations in science, engineering and technology combined with safe, effective, efficient and secure operations, business practices and work environment," he said.

"Add an effective program of technology commercialization and the remarkable level of ORNL support to and from the community, and we can

make significant contributions in these areas of national importance," Wadsworth said.

He outlined five initiatives for improving operations and environment, safety and health, including "fixing the place up," improving safety and operational discipline,

rethinking nuclear operations, improving efficiency and productivity, and placing new emphasis on workforce development.

Wadsworth stressed the importance of the modern research campus that is taking shape as a result of the \$300 million facilities revitalization plan supported by state, DOE and private funding. "We must have a modern image and vision in order to renew our Laboratory and attract new people."

The new image and vision have been key as ORNL has established its baseline science and technology and mission framework, he explained. "The important early 21st century research themes are centering on nano [nanoscale science and technology], info [ultrascale computing and simulation], and bio [complex biological systems]. Our research divisions can make significant contributions in these areas, and the confluence of fields is where there is so much excitement for the future," Wadsworth added.

He said ORNL is assembling world-class

(See LAB page 6)

'Russell oak' graces grounds of new Mouse House

A few weeks before the formal dedication of ORNL's Russell Laboratory for Comparative and Functional Genomics on May 7, Liane Russell helped plant an oak tree beside the new Mouse House. The tree honors "Lee" and her late husband, Bill Russell. They both attended the groundbreaking ceremony for the facility in 2001. He died last year.

Russell remarked on April 23 that her late husband, who worked with her to protect wilderness areas in the region they adopted, would have found the oak tree a fitting tribute. "Bill loved the natural world and spent the last years of his life trying to save pieces of it as deciduous forests are being slaughtered."

She has an office at the new lab. At the old Mouse House at Y-12, Russell said she delighted in watching the groundhogs outside "slurp" up the kudzu. At ORNL's Life Sciences Complex, she enjoys watching the turkeys and strolling down the popular hiking and jogging trail that leads off the west end.

The facility's formal dedication, on May 7, was attended by Rep. Zach Wamp and Marvin Frazier, director of the Life Sciences Division in DOE's Office of Biological and Environmental Research.—*Bill Cabage*

Liane Russell tosses a shovelful of dirt around the oak tree at the new Mouse House as Dabney Johnson (right), Reinhold Mann and others look on.



Curtis Boles



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Curtis Boles

Lab Notes

Reactor and the SNS that weekend, hosted by Lab Director Jeff Wadsworth and former associate director and ORCMA booster Alex Zucker.

Could more music on Main Street be in the offing? That remains to be seen. Last fall's "Party on Main Street," which rolled out the new area for the staff Main Street, featured Americana music. The atrium area in the new Research Office Building seems to be also very acoustically suited to classical sounds.

Performing in the quartet were Susan Gunning, violin; Susan Eddlemon, violin; Susan Shor, viola; and Alicia Randis-Hooker, cello.

Shull's papers note Wollan's role

The papers of Nobel Laureate Clifford Shull have been given by his family to Carnegie Mellon University, where the Nobel laureate did his undergraduate studies, then known as Carnegie Tech. The Shull Collection, dating from approximately 1937 to 1986, includes his time as a researcher at ORNL where work at the Graphite Reactor resulted in what is considered the discovery of neutron scattering research.

Shull's work was cited in 1994 with a share of the Nobel Prize in Physics, with Bertram Brockhouse.

According to Carnegie Mellon's media release on the gift, which came with an \$8,000 grant to maintain the collection, "Among projects represented in the collection are Shull's creation of the first neutron Laue photograph, his discovery ... of antiferromagnetism, his mapping of hydrogen atom locations within palladium, his work ... concerning the magnetic structure of the Fe3Al compound, and his Nobel Prize-winning research with Ernie Wollan on the crystal structure of ice and water."

The release also notes that Shull and Wollan built on Wollan's initial experiments at ORNL. Wollan's recognition in Shull's papers is a fitting tribute to his colleague at ORNL, who died before the neutron scattering discovery received Nobel recognition.

Stan Auerbach, pioneer

Stan Auerbach, founding director of ORNL's Environmental Sciences Division, died May 1.

He left a prominent legacy at ORNL. The western complex of the laboratory grew from the construction of Bldg 1505 and adjacent facilities that resulted from the burgeoning environ-

mental and ecological science programs of the 1970s and '80s. Auerbach led those programs as director of the Ecological Sciences division from 1970 to 1972 and the Environmental Sciences Division from 1972 until he retired in 1986. He was recognized as a pioneer of using radioactive tracer elements in the study of ecological systems.

Reported by Bill Cabage

SNS completes another leg to '06

The Spallation Neutron Source continues its drive toward 2006 completion, on time and on budget. April saw the commissioning of the drift-tube linear accelerator, one of four different types of accelerators used in the SNS. A pulsed current of negative hydrogen ions was accelerated through three of six drift-tube tanks. The beam was then channeled to a diagnostic location and measured.

The drift-tube linac, designed and built by Los Alamos National Laboratory, will join three other types of linac on the 300-meter journey from the front end to the target, accelerating a proton beam that will strike the mercury target, "spalling" neutrons from the nuclei.

The process sounds pretty far out and technical, but public interest in the SNS continues to thrive. More than 400 members of the public attended April's open house, including representatives of local media.

Have some Bach with your latté

Those who happened to be walking down Main Street on April 15 received a rare treat: chamber music, courtesy of the Oak Ridge Civic Music Association. The quartet performed to promote the next weekend's appearance by the National Symphony Orchestra in Oak Ridge.

Maestro Leonard Slatkin, the NSO's conductor, received a tour of the Graphite



Curtis Beales

Alex Zucker (center) brought this string quartet and, later, the National Symphony Orchestra's Leonard Slatkin to ORNL.

Oak Ridge National Laboratory

Who's for lunch?

You would expect that the volunteers going through items sent to the ORNL History Room would come up with a gem now and then. Bob Crouse, an M&C Division retiree who has been reviewing images, found this 1954 menu in a stack of stuff. It looks almost Atkins-friendly. If the right side of the menu makes you painfully nostalgic, remember that this was back in the days when a shave and a haircut was two bits.

OAK RIDGE NATIONAL LABORATORY CAFETERIA	
LUNCHEON MENU	
JULY 14, 1954	
CHICKEN OR CHICKEN SOUP	.35
MEAT CORNBREAD	.35
ENTREES	
BREADCRUMB FRANKFURTERS	.40
GRILLED VEAL STEAK	.40
"ORNL SPECIAL LUNCHEON" .50	
CHICKEN REEF BAKE MUTTONED CARROTS - GREEN BEANS (NO SUBSTITUTIONS, PLEASE)	
SPECIAL - CHICKEN CROQUETTE .50	
CROQUETTE OF 1 (10¢) VEGETABLE CROQUETTE OF SALAD OR DESSERT (PIE, CAKE OR 1 CUP ICE CREAM) HOT SOUP AND BUTTER	
SALAD COLD PLATES	
COLD PLATE W/SALAD AND PIMENTO CHEESE SANDWICH	.55
CHICKEN SOUP W/SALAD	.50
FRUIT PLATE	.45
TOMATO STUFFED W/BAKED EGG SALAD	.35
SANDWICHES	
MEAT AND BEAN SALAD SANDWICH	.30
SALMON SALAD SANDWICH	.30
PIMENTO CHEESE SANDWICH	.30
HOT DOG W/CHILE	.30
HOT DOG - PLAIN	.40
VEGETARIAN	
MUTTONED CARROTS	.10
WHOLE KERNEL CORN	.10
FANCIET POTATOES	.10
CHICKEN NUGGETS	.10
SALADS	
RUSSIAN VEGETABLE SALAD	.15
TOMATO AND COTTAGE CHEESE SALAD	.15
FRUIT ORANGE JELLY	.15
CHESTNUT CABBAGE AND CARROTS	.10
HEAD LETTUCE	.10
DESSERT	
CHERRY PIE	.15
PECAN PIE	.15
CAKE	.10
CORN MUFFINS - BUTTER TOAST - 2 TOP	.05

ORNL researchers judge projects, encourage region's future scientists

More than 30 ORNL researchers spent time earlier this spring evaluating the work of students who might be following in their footsteps toward careers in science.

The Lab staff members served as judges in the Southern Appalachian Science and Engineering Fair at the University of Tennessee's Thompson-Boling Arena.

The fair, cosponsored by UT-Battelle, covers the floor of the massive arena with outstanding science projects developed by high school students from throughout the Southeast. Deciding which ones are best can be a daunting task, but ORNL's Bruce Tomkins looks forward to the annual challenge.

"I take vacation time to do this because I enjoy the experience and because this is an important program that I want to support," says Tomkins, a member of the R&D staff in the Chemical Sciences Division.

Andy Andrews of the Engineering Science and Technology Division serves as vice president of the fair. He says the lab's participation and co-sponsorship demonstrate ORNL's longstanding commitment to science education.

"The judges feel it's important to cultivate interest in science and technology among our youth," Andrews says. "They enjoy gathering with peers away from the workplace and working together and socializing in a relaxed atmosphere. Through their positive, encouraging interaction with the students, we hope that at least a few of the teens will be influenced to seriously consider careers in science and technology. We work hard as judges, but we also have fun."

Andrews served as a judge for 15 years until he was elected an officer a year ago. He recruits judges in various scientific specialties, including many from ORNL and UT.

"I recruit judges to cover all of the exhibits for ranking purposes and for selecting special

award recipients and equip them with information they need to make fair and consistent evaluations," Andrews says. "This year we had more than 40 sponsors for almost 100 special awards recognitions. I put each judge on a team assigned to evaluate a set of projects matching his/her own specialties."

Tomkins says the judging process takes from 6-8 hours per day following a meeting to go over the judges' manual. In addition to reviewing the projects, judges also must spend time interviewing the students.

"We want to know their thought processes when they were developing the projects," he says. "Do they understand the programs and recognize their limitations? How scientific was their work?"

Tomkins says judges also must review documentation prepared during project development. "The judges' activities are similar to the peer review process for research at the lab," he adds.

When going through his judging procedure, Tomkins seeks to gain a wide picture of the experience the students have had from start to finish on their project.

"I'm looking for something more than just what the students get off the Internet or out of an encyclopedia," Tomkins says. "I also want to know how much adults may have contributed. After all, these are student projects."

Other ORNL judges included Glenn Allgood, T.J. Blasing, Hank Cochran, Sujit Das, Ann Farrar, Nidia Gallego, Robin Graham, Maurice Greene, Peter Khalifah, Wayne Manges, John McKeever, Johnny Moore, Paul Osborne, Steve Parham, Wayne Parker, Karen Peacher, Richard Raridon, Adam Rondinone, Paige Stafford, Therese Stovall, Ross Toedt, Guido Verbeck, Charles Weber, Al Akerman, Stacy Hutchens, Lorene Sigal, Ed Krieg, Marv Poutsma, Steve Trotter, Jim McEvers and Tim Bigelow.—Fred Strohl [ornl](#)

Atom-scale

Continued from page 1

However, slight changes in how the doping agents eventually situate themselves in the silicon nitride ceramic affect the materials' properties. In the past, researchers seeking the best properties have had to try different combinations until they arrive at the best material.

"Rare-earth elements like lanthanum and lutetium have quite different effects," says Becher. "You get different-looking microstructures with different properties. The real question was, why do these elements cause these changes?"

"The theoretical calculations led by Painter predicted that these elements had different preferences for locating themselves at the silicon nitride grain surfaces. Those like lanthanum were seen to want to go to the grain surfaces, causing long, thin grains to form. On

the other hand, lutetium was predicted to be less likely to locate next to the grain surface, which allows the grains to grow fatter," he says.

"We know that the particular microstructure we can obtain and the nature of the amorphous film strongly affect the properties of the silicon nitride. So knowing 'the

Knowing 'the why' is critical.

why' is critical to the development of new materials," Becher says.

Because of the presence of the amorphous films around each silicon nitride grain, "it is very difficult to see these dopant atoms in a microscope," Pennycook says, adding that this was a "good problem" for his world-record holding Z-contrast STEM. Shibata's Pixon-enhanced images corresponded to the theoretical predictions of ORNL's Painter so closely that Pennycook and Becher, who are both ORNL corporate fellows, believe future researchers will be able to confidently design materials by computer, significantly speeding the development of new advanced ceramic materials.

"Now we know, at the atomic level, why things are happening," Becher says. "This will allow researchers to create materials that are much tougher and stronger. And those materials will be found in tomorrow's advanced microturbines and auxiliary power systems for aircraft and trucks."—Bill Cabage [ornl](#)

Veteran softballers sought

An area team is looking for "a few good older men" to play slow-pitch softball. If you're over 60 and want to play on Tuesday and/or Thursday night, contact Peter F. Dittner at 671-8036 or pdittner@aol.com.

New staff members

ORNL is growing. This new feature lists new employees at the Lab. Welcome.

Candace Breeden, Business Management
Mike Bradley, Communications and Community Outreach Directorate

Lloyd Borchert and Robert Patton, Computational Sciences and Engineering

Eric Nafziger and Jennifer Palmer, Engineering Science & Technology

John Powell, Environmental Protection and Waste Services

Giriprakash Palanisamy, Environmental Sciences

Stacy Hughes, Health Services

Brenda Cherry, Logistical Services

Mary Northcutt, Metals and Ceramics

Penny Hosford, National Security Directorate

Scott Alcala, Mary Johnson and Sharon

Wagner, Nuclear Science & Technology

Stuart McCullough and Ethan Turner,

Operational Safety Services

Joddy Collins and Bernard Ducamp, Research Reactors

Danny Crisp, Nick Grinnell and Pamela Kite, SNS Accelerator Systems

LaTeasha Fritts, Stephanie Gregor, Stephen

Miller, Karen Vogel and Lakeisha Walker,

SNS Experimental Facilities

Lea Carignan and Jon Truan, SNS Project

Office

High Flux Isotope Reactor marks 400th fuel cycle

ORNL's High Flux Isotope Reactor, one of the world's most powerful research reactors, is marking a milestone in May—its 400th fuel cycle since it began operation in 1966.

A fuel cycle represents the time—about 25 days—it takes for the reactor's uranium fuel to become depleted. During operation, HFIR uses the nuclear fission process to produce the world's most intense neutron beams for materials research and isotope production.

"HFIR's unique characteristics are of immense value to both the scientific community, which uses its neutron beams for a wide range of studies on materials, and to industry, which relies on the neutrons for isotope production and advanced materials analysis and development," says ORNL Director Jeff Wadsworth.

The HFIR's research community has recently benefited from a series of upgrades supported by DOE's Office of Science, including installations of new beam lines, which channel neutrons to experimental

instruments. A new experiment hall has been constructed, and a "cold source" is in preparation that literally chills the energetic neutrons, slowing them and making them more useful for studying polymers and biological materials.

The reactor also has a new cooling tower and beryllium reflector as part of an ongoing program to upgrade components and infrastructure for another three decades of operation.

Researchers from all over the world come to Oak Ridge to perform experiments at the HFIR. In 2006, the reactor will be joined by the Spallation Neutron Source to make ORNL the world's leading center for neutron research.

"SNS and HFIR are complementary. The combination of a world class research reactor with SNS, the world's most powerful pulsed neutron source, is unbeatable," says Jim Roberto, associate Laboratory director for Physical Sciences.

While the HFIR produces steady-state

beams of neutrons, the SNS will produce neutrons in pulses from an accelerated beam striking a target. HFIR and SNS will be equipped with a suite of state-of-the-art instruments for neutron scattering experiments.

Neutron scattering is a powerful tool for determining the structure and properties of materials at the atomic scale. The technique was developed at ORNL in the 1950s by Ernie Wollan and Cliff Shull. Shull later won the Nobel Prize in Physics for this work.

The reactor also produces radioisotopes used in nuclear medicine and is the world's only source of californium-252, an isotope used in cancer treatment and industrial analysis. These nuclear materials are processed and refined at the nearby Radiochemical Development and Engineering Center.

"The HFIR team is to be congratulated on this milestone," Roberto says. "HFIR is a unique national facility that owes its success to the long-term dedication of hundreds of people."—*Bill Cabage* 

Lab's property management is \$10 million business

At ORNL, property management is big business. "It's a \$10 million enterprise and has the potential to add even more value to ORNL's bottom line and operating finesse, with the help of the company as a whole," says Will Minter, division director for Asset Management and Small Business Programs, who assumed responsibility for Property Management last year.

The core mission, says Minter, is to protect government-owned property. "The expectation is that this protection will include processes and decisions that promote efficiency, cost savings and the safety of every employee involved. We are reinventing the way we manage property, emphasizing ownership and accountability in our process."

That process presents an opportunity to provide a hefty return on investment back to the Lab. ORNL has an estimated \$494 million invested in equipment, based on acquisition costs. This amount includes equipment that costs more than \$5,000 and items designated as sensitive.

Each year, divisions release their pre-owned—or excess—equipment to the property management process. Minter describes the three actions

leading to disposal: redeployment, online sales and auction.

Redeployment considers "best use" decisions for equipment that still has application potential, he said. "Through the Excess Property Redeployment Program, stakeholders from fellow agencies to employees to the community are able to benefit. This action is thoughtful, yet swift, and supports many important long-term relationships."

When redeployment is complete, the process moves to Phase 2: e-Bay. "That might surprise some, but e-Bay has proven to be a highly successful outlet," Minter explains. "All equipment that cannot be redeployed moves to e-Bay. Property Management currently nets \$141,000 annually, and this figure is steadily rising. We like to call this phase 'OPM': Other People's Money!"

In Phase 3, Minter says, remaining equipment is sold to the general public through auctions. "We have four state-certified auctioneers on staff. In FY 2003, we netted \$123,500 through auctions. This, too, is expected to increase."

Property Management also secures pre-owned equipment from other federal sites. "For example, we have assisted in obtaining various pieces of pre-owned equipment for the SNS, including the 1,000-ton crane known as 'Big Bertha.' The \$3 million crane was transferred from Lawrence Livermore for only the shipping cost," Minter says, adding that ORNL staff members may contact the Property Management staff, 576-7610, for assistance in obtaining pre-owned items from other sites.

Property Management handles 45,000 pieces of equipment annually and has not had a recordable injury in five years. "This is a tremendous accomplishment, and our employees take great pride in this record," he says.

"Chief Financial Officer Greg Turner has challenged us to achieve best in class in service, savings and safety," Minter adds. "Cheri Cross, manager of Property Management, and Marcia Whitson, Property Disposition coordinator for pre-owned government equipment and property sales, have adapted the continuous improvement challenge. It's important that they receive your ideas and input.

"This is an enterprise whose success depends on how well its processes and decisions are understood. Please tell us: How can we serve you even better? We're all in this business together." 

Excess Property Redeployment Program

Recipient	Pieces	Acquisition Cost (\$)
Redeployments to ORNL, BJC, and ORO personnel from the Warehouse	2,238	849,473.00
Redeployments to ORNL personnel via Swap Shop	131	290,526.00
Chemicals reutilized from the CMC – Chemicals Reuse Warehouse managed by Pollution Prevention Group	3,211	282,724.00
Excess property brought from other federal agencies to ORNL for use	1,214	5,250,873.00
Computer donations to schools (secondary and elementary)	656	860,031.07
Donations to DOE agencies	501	1,485,215.70
Donations to universities	2	76,864.00
Donations to non-profits, schools, and state	442	43,719.50
Donations to other Federal agencies	67	13,623.75
TOTAL	8,462	\$ 9,153,050.02

Lab

Continued from page 1

tools for nanoscale R&D, including the Spallation Neutron Source, the High Flux Isotope Reactor, powerful electron microscopes and the Center for Nanophase Materials Sciences.

"The SNS is 80 percent complete, on schedule, on budget and on scope. When it is combined with HFIR and our other resources, we will have the best facilities in the world for neutron science," he said.

Wadsworth also explained the critical research need for leadership-class computing and simulation capabilities. "We must have massive computing power, because there are many experiments that you cannot actually perform but must simulate," he said, citing climate modeling as a prime example.

"We have the nation's largest unclassified computing facility, are on track to deliver a leadership-class Cray system and have a well-developed strategy for success in this area," Wadsworth added.

He also discussed the move to realign ORNL's biology program to support DOE's genomics initiative. "Major opportunities are emerging in the genomics area for DOE, the National Institutes of Health, and the departments of Homeland Security and Agriculture."

Wadsworth talked about specific successes in ORNL efforts to develop a sustainable national security role, including progress in deploying the SensorNet system for rapid and reliable detection of hazardous materials.

Meeting the nation's energy challenge is a continuing emphasis, with Laboratory efforts under way to help develop hydrogen as a dependable energy carrier, improve the U.S. electric grid, provide a safer and more efficient nuclear energy option, and make fusion power a reality.

Wadsworth also outlined unique ORNL resources for assisting with environmental problems, citing research in climate change, environmental remediation and air quality.

"Our R&D in these and other areas is highly relevant," he said, remarking that ORNL made significant contributions to eight of DOE's Top Ten Science Achievements in 2003. The eight are: international fusion energy project (ITER); high-performance computing for science; human genome sequence finished; Center for Nanophase Materials Sciences groundbreaking; progress in restoring sight to the blind; stitching together a genome and learning to use microbes to solve national needs; the nature of nuclear matter; and DOE undergraduate research internships.

"As we strive to continue this outstanding performance, we face several near-term challenges," Wadsworth said. "Those in science and technology include delivering the Spallation Neutron Source; winning a leadership-class computing facility; regaining leadership in biology; building sustainable portfolios in national security, energy and

environment; and recruiting and retaining a 21st century workforce.

"In the operations/ES&H area, we must improve safety and operational discipline, correct infrastructure issues affecting the safety of our work space, and reduce the cost of operations. In the community service arena, we are focusing on securing a use permit for technology commercialization," he said.

ORNL people

The Nuclear Nonproliferation Program office has been formed in the Energy and Engineering Sciences Directorate. The office, headed by **Larry Satkowiak**, began operations April 1.

"The work of the NNP office is obviously intimately connected with National Security and, as such, will have a reporting relationship to the National Security Directorate," said E&ES Associate Lab Director Dave Hill.

The scope of the NNP office includes all programs carried out for the Office of Defense Nuclear Nonproliferation of the National Nuclear Security Administration, as well as programs performed for other agencies that specifically address nonproliferation issues.

Marilyn Brown, director of the Energy Efficiency and Renewable energy program, has been awarded the 2004 Anderson Medal of Applied Geography from the Association of American Geographers, "...for leadership and impact at the national level in applying the concepts of geography's innovative diffusion theories to address clean energy technology transfer processes" and "...for serving as a national leader in the analysis and interpretation of energy futures in the United States." The award was also won in 1995 by **Tom Wilbanks**, making ORNL the only institution with two winners.

Eight members of the ORNL Fabrication Division—Division Director **Claude Robison**; the Welding Section lead, **Dan Mobley**; and six manufacturing engineers, **John Cox**, **Max Cronan**, **Doyle Garrett**, **Tim Harvey**, **Karl Thatcher** and **Fred Saffhran**—are among the first group to have received the training and qualifying examination leading to certification as supplier lead auditors under the new Battelle-wide Supplier Lead Auditor Certification program. The eight successfully completed training and a written exam and will subsequently be qualified and certified under the new Battelle standards to lead audits of suppliers/vendors under consideration for usage by ORNL.

The Oak Ridge YWCA presented the **Nuclear Science & Technology Division** with a meritorious volunteerism award recognizing the division's valuable contributions to the Y. NSTD adopted the agency's Crisis Shelter and has been providing year-round assistance for several years. Spearheaded by the NSTD volunteers

"We look forward to involving our talented staff in solving these and other important challenges," Wadsworth said. "We obviously have a lot going on, and I'd say the state of our Laboratory is outstanding."

Wadsworth's State of the Laboratory address was presented as part of the 2004 Community Lecture Series organized by the Friends of ORNL.—*Cindy Lundy* [ornl](#)

committee, the division conducts seasonal drives to meet the needs of the women and children housed at the crisis center. These drives include back-to-school supplies, spring baskets, Christmas gifts, and other collections targeted to meet the center's needs. **Jim Rushton** (NSTD acting director), **Jan Anderson** and **Lynn Duncan** accepted the award on behalf of the division.

Mike Bradley has joined ORNL as the laboratory's new manager of communications in the Communications and Community Outreach directorate. He comes to ORNL from the University of Tennessee, where he worked in a variety of communications roles for more than a decade. Bradley will coordinate external and internal communications activities.

Tina Curry, whose creativity has adorned many ORNL posters and publications, is a new team leader in the Graphics Design division of Creative Media, also in the C&CO Directorate.

Dan Mobley, chief welding technologist with the Fabrication Division, received the Section Level of the Dalton E. Hamilton Award. This award is administered by the American Welding Society Certification Committee and recognizes outstanding AWS members. Qualification for this award is for participation in the Certified Welding Inspectors and Certified Associate Welding Inspector Program. Selection is based upon meritorious contributions in the areas of inspection and social and civic activities that have enhanced public awareness or otherwise made an outstanding contribution to the science of welding inspection.

Samuel McKenzie, SNS Accelerator Systems, has been honored with a Top Young Professionals of Knoxville Award, "for career leadership among young professionals." The award is presented by Club LeConte in cooperation with the Knoxville Area Chamber Partnership.

The Fusion Energy Division's **Nermin Uckan** has been appointed to the North Carolina State University Nuclear Engineering Industrial Advisory Committee.

Lorena (Tykey) Truett of the Transportation Policy & Planning Group in the Engineering Science & Technology Division, has accepted an appointment to the Transportation Research Board's Committee on Women's Issues in Transportation. The appointment continues until April 2007.

United Way off to early start

ORNL's 2004 United Way campaign team members—led by Audit & Assessment Director Scott Branham (chairman) and Deputy Laboratory Director Lee Riedinger (co-chairman)—aren't waiting for the official kickoff in late July to rev things up.

A return of the popular "Books Are Fun" book fair raised nearly \$1,500 for the campaign in April, and calls already have gone out for silent auction donations and for recipes to include in an addendum to the successful 2003 cookbook.

Organizers of the auction are looking for artwork, crafts, products and services for the fundraiser. Not sure what you might contribute? Consider that items from last year ranged from beautiful pottery, floral arrangements, framed scenic photographs and afghans to ORNL watches, a Phil Fulmer-autographed football, Pat Summit-autographed basketball, a BandFlex gym and a wakeboarding session.

Disappointed that your favorite recipes aren't in last year's UW cookbook? You have another chance. Campaign organizers are preparing an addendum to the 60th anniversary collector's edition volume. Copies of the addendum will be available during the 2004 campaign and can be inserted into existing cookbooks. A limited supply of the collectible 2003 cookbooks also will be available.

To submit a recipe, donate an item for the auction or find out more about either activity, contact auction and cookbook coordinator Carol Leffew, leffewcj@ornl.gov, 574-5982 or Bldg 1000, MS 6446.

Other members of the UW campaign team include: Peggy Brown (graphics), Danny Cantrell (ATLC rep), Nancy Gray (special events), Tammy Hill (treasurer), Susie Kuliasha (agency tours/special events), Barbara Littleton (book fair), Cindy Lundy (public relations), Lenora McBece (payroll stats), Lisa Patt (materials), Elaine Slaten (support to chairman), Kay Thacker (support to co-chairman), Greg Turner (2003 chairman) and Carolyn Ward (training). [ornl](#)

Team UT-Battelle to 'walk as one' against bias

An enthusiastic crowd of ORNL staff assembled at the cafeteria to hear Jeff Wadsworth kick off the lab's participation in the 2004 "Walk as One" walkathon against bias, bigotry and racism.

"ORNL is committed to attracting and sustaining a diverse world-class workforce, and demonstrating leadership in building a strong, inclusive community is an important element of that commitment," he said. Living in Germany, Holland, England, India, Singapore and the San Francisco Bay area before moving to East Tennessee helped shape his appreciation of diversity, he added.

Wadsworth said he plans to participate in the walkathon, set for 4 p.m. June 6 at Volunteer Landing, along Knoxville's Neyland Greenway. He also encouraged staff to join Team UT-Battelle's support of the event.

The walk is the primary regional fundraiser for the National Conference for Community and Justice, a non-profit group that promotes skills among youth, community leaders and educators to build a more just and inclusive society.

"We have the opportunity to make a

real difference in our community in this area," said Cindy Kendrick, ORNL Concerns Program coordinator and an organizer of the kickoff. For more information or to volunteer for the team, contact Kendrick

(kendrickcm@ornl.gov, 241-6584), Mylissa Buttram (buttramms@ornl.gov, 576-2436) or the NCCJ office (637-6140, kaustin@nccj.org).

Team UT-Battelle members also helped make a two-mile stretch along Highway 95 cleaner and easier on the eyes during the recent **Trash Bash**. Some 35 ORNL volunteers collected more than 80 bags of trash from both sides of the highway. The cleanup significantly improved the scenery along the western approach to ORNL.

Coordinators Bonnie Brummitt and Bill Pardue were assisted by some hardworking task leaders, including Teresa McKinney and Cindy Kendrick, Energy & Engineering Sciences; Shravan Indrakanti, Physical Sciences; Carolyn McNew, Facilities and Operations; Bo Saulsbury, Biological & Environmental Sciences; Ernest Ryan, ESH&Q; and Sandra Holt, Audit & Assessment. [ornl](#)

Service anniversaries

April

40 years: James F. Lyon, Fusion Energy

35 years: William Holmes, Jr., Engineering Science & Technology

30 years: Gail A. Weaver, Business & Information Services Dir.; Larkee Moore, Communications & Community Outreach Dir.; Jo Ann Fitzpatrick, Contracts; Howard Ray Clower, Delores A. Cole, Larry W. Cox, Hendricks Okenell Johnson, Rolando Long, James C. McMillin, Richard Karl Woods and Gary A. Wright, Craft Resources; Carl W. Martin, Jr., Engineering Science & Technology; Lynn J. Degenhardt, Facilities Development; Vickie S. Martin, Facilities Management; Joe P. Strizak, Metals & Ceramics; Lola M. Rutherford, Nuclear Science & Technology; Sue C. Owen, Office of Counterintelligence; Frank Waddell, Quality Services

25 years: Barry A. Berven, Biological and Environmental Sciences Dir.; B. E. Justice, Craft Resources; Richard I. Crutcher, C. Stuart Daw and Mark P. Ternes, Engineering Science & Technology; Roger D. Miller, Facilities Management; James S. Bogard, Life Sciences; Randy J. Parten, Metals & Ceramics; Deborah Kay Milsap, Nuclear Science & Technology; J. Steve Ivey, Quality Services

20 years: Scott L. Wood, Business & Information Services Dir.; Gabrielle L. Burn, Robert Noel Morris and Roger E. Stoller, Metals & Ceramics; C. L. Fitzgerald Jr, Doug Gasaway and Pamela S. Tarlton, Nuclear Science & Technology; Wylda Jo Jones, Operational Safety Services; Soren P. Sorensen, Physics

May

35 years: C. J. Humphreys, Business & Information Services Directorate; Carl Elbert Allred, Jackie Bryant and H. L. Hodge, Craft Resources

30 years: Betsy A. Riley, Computer Science and Mathematics; Dennis Dodd Connelly, Stevan Marc Dawn, Clifton Allen Foster, Paul D. Rogers and Donald C. Sampsell, Craft Resources; Betty Whaley Ledford, Fabrication; R. Wayne Johnson and Charles A. Lamb, Jr., Facilities Management; Vicki J. Massey, Health Services; Ronald Dale Clark and Pamela H. Vasquez, Integrated Operations Support; H. Michael Shearin, Laboratory Protection; Wallace J. McAfee, Loy T. Gibson and Lee Heatherly Jr., Metals & Ceramics; John M. Begovich and Robert Michael Westfall, Nuclear Science & Technology; Eddie Ray Tapp, SNS Accelerator Systems

25 years: George D. Wignall, Condensed Matter Sciences; Betty Spencer Salada, Contracts; Gary Allan Topmiller and Charlyn Shephard, Craft Resources; Thomas E. Bethea, Laboratory Protection; David C. Harper, Metals & Ceramics; Robert Paul Effler Jr., Quality Services

20 years: Scott A. McLuckey, Chemical Sciences; Norman Ray Kurtz, Craft Resources; Regina Kay Ferrell, Engineering Science & Technology; Brian S. Wallace, Networking & Computing Technologies; Kimberlee Ann Breeden, Nonreactor Nuclear Facilities; Michael R. Dinehart, Physics

UMass students spend break building efficient Habitat home

Fifteen students from the University of Massachusetts' Dartmouth campus spent their spring break helping to build a Habitat for Humanity house in Lenoir City as part of the Net Zero Energy program that includes utilization of ORNL technology.

The students, part of the university's 2005 Solar Decathlon Project, worked on a house that is being constructed by Habitat for Humanity of Loudon County through the



Curtis Botles

Jim Rich of Farragut—a volunteer with Loudon County Habitat for Humanity—works with UMass students to measure a wall of a home under construction in Lenoir City.

coordination of Jeff Christian, director of ORNL's Buildings Technology Center.

Christian says the visiting students from New England got first-hand experience in the future of home construction.

"They made a valuable contribution in the progress of building this house," Christian says. "What they experienced with the new construction materials utilized is the wave of the future in homebuilding."

Christian says ORNL's work in Lenoir City

with the Habitat program has gained a national reputation, as evidenced by the Massachusetts students' desire to visit and work there.

Three Habitat houses in the Harmony Heights Subdivision of Lenoir City already have been constructed with homebuilding technologies either developed or tested through ORNL's Buildings Technology Center.

The students concentrated on installation of the walls, roof and windows, as well as the envelope air tightening, which insulates the house from the outside elements better than that in conventional houses. The students were involved in installing structural insulated foundation panels, including those for the walls and roof.

The students erected the above-grade walls in five hours and the roof in three. The foundation panels are Dow Chemical's TMass system, which contain ORNL-installed heat flux transducers and thermocouples. The thermal mass of these panels will not only keep the house warmer during the winter and cooler in the summer, but also will delay the peak cooling energy required from these houses.

As has been the case with the previous Habitat houses, energy measurements in this structure will be studied to compare costs between conventional construction and the new technologies included in the new house.

"We hope this house will be at least as energy efficient as the others but less costly to construct," Christian says.—Fred Strohl [ornl](#)

ORNL's 60th on display at ET history center

The prize-winning entry "Preserving Oak Ridge History: Oak Ridge National Laboratory's 60th Anniversary Celebration (2002-2003)," recipient of an award of distinction from the East Tennessee Historical Society, is now on display in the East Tennessee History Center as part of the McClung Historical Collection. ORNL Visitor Relations Coordinator Marilyn McLaughlin presented the entry to Steve Cotham, manager of the McClung Collection.

The extensive entry, which was compiled by McLaughlin, encompasses the many activities related to ORNL's anniversary observance. The East Tennessee History Center, on West Clinch Avenue in downtown Knoxville, houses the McClung Collection as well as the ET Historical Society and Museum of East Tennessee History.



Marilyn McLaughlin and Steve Cotham



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[Record STEM](#), page 1

[State of the Lab](#), page 1

[Lab Notes: String music, SNS test, menu au '54, Shull papers](#), page 3

[Science fair volunteers](#), page 4

[HFIR's 400th, property savings](#), page 5

[UW, Team UT-B](#), page 7

Inside