

Reporter

OAK RIDGE NATIONAL LABORATORY

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Secure subjects

Homeland Security program's students check out security-related R&D

Students interested in science and technology careers with applications relevant to homeland security are getting a head start at ORNL this summer by participating in the



Eva Millwood

Michigan State University grad student Jennifer Froelich is one of seven students participating in the DHS Scholarship and Fellowship Program. Her studies involve developing methods for biothreat detection.

Department of Homeland Security Scholarship and Fellowship program.

Organized through the Oak Ridge Institute for Science and Education, the diversity of this year's seven participants reflects the diversity of disciplines integral to DHS objectives. Collectively, the students are studying chemical and mechanical engineering, mathematics, chemistry, computer science and linguistics.

All of the students applied in 2004; two are graduate students returning for the second of three years, one first-year graduate fellowship student is returning after an undergraduate scholarship, and four undergraduates are in the second of two summers.

"The scholarships and fellowships awarded to students pay for school, and the students are required to do a 10-week internship at a DHS-funded or DHS-approved project," says ORISE Project Manager Sam Held, who oversees the participants' safety training, housing, transportation and logistical issues.

After applying for and being accepted into the program, the students travel to Washington, D.C. for an introduction, DHS briefing and a

rundown of the summer projects in which they can participate.

"It's kind of a science, matching up those that want to do the work with those that want them to do the work," Held says.

The purpose of the internship is to prepare students for research fields that are relevant to homeland-security applications and encourage participating students to seek a career with the DHS.

"If they offer us a job, obviously we're going to be ecstatic," says North Carolina State University computational and applied mathematics graduate student Stacey Ernstberger, adding that the students, however, are not under any obligation to interview with or become employed by the DHS.

Caleb Sancken, a Valparaiso University senior in mechanical engineering, says that an interest in furthering the goals of the DHS is an unspoken prerequisite for application. "That's their filter," Sancken says. "If you're not interested in homeland security, you're

(See **SECURE**, page 5)

Leeches, not beaches: Summer campers explore science

Last month rising fifth, sixth and seventh graders responded to their callings as young scientists, immersing themselves in some very scientific fish painting, squid dissecting and bug catching.

The annual ORNL Science Explorers Camp focuses on a variety of interactive field experiences that cover a diversity of scientific topics. Imagine Bill Nye meets Nickelodeon's gross-out humor and you've got a pretty good picture of a day in the life of the science explorers.

Rising sixth-grader Haley Whitaker of Knoxville wants to be "a scientist or an oceanographer," so she looks right at home pursuing the lips of a dead fish to apply green acrylic-paint lipstick with a sponge.

"This isn't totally disgusting. I've seen dead things before," Haley says.

What she's doing—painting the body of a gray triggerfish and pressing a t-shirt on top of it to make a print—is one of the many hands-on activities that the students took part in during the two week-long camps.

Camp leader Steve Oliver's background is nearly as diverse as the kids' activities; he

holds degrees in mathematics, statistics, computer science, geology and physics, so planning introductory activities in light activity, electricity and motion, and potential and kinetic energy was a piece of cake.

"We fill this basin with saltwater and hang a wire over the surface so that the tip is suspended in the middle of the container," Oliver says, demonstrating an electrical-current and magnetism activity. "Then we put two magnets across from each other in the basin, and the campers can watch them move when we flip the switch here, and see the forces in motion."

"Except with this group, we don't use the word force," Oliver explains, with a twinkle in his eye.

Avoiding strong words is probably a good idea—the campers are all pretty strong-willed themselves. Even a bench full of giggling 10-to-12-year-old girls snaps to attention when Kris Light, another veteran camp leader, calls for focus on the day's book about aquatic life.

"Ooh, ooh, read about leeches," says one of the girls, who a moment earlier had been



Curtis Boles

Science camp instructor Kris Light helps camper Haley Whitaker prepare a triggerfish for t-shirt art.

talking hair barrettes and braids with her seatmates. If they can't wait to hear about leeches, they'll get really excited about the next day's chemistry demo involving liquid

(See **CAMPERS**, page 5)

Lab opens doors to new campus, SNS on August 27

ORNL is hosting its first Community Day in eight years on August 27 with a theme of "Ready for the Next Generation of Great Science." All Lab staff members and their families and friends are welcome at the Saturday event, which will focus on the new east campus with bus tours offered to the Spallation Neutron Source.

"We're excited about giving the community an opportunity to see the growth and modernization that we've been talking about for the past several years," says ORNL Director Jeff Wadsworth. "Our visitors will surely have high expectations of our new campus and the SNS, and they are not going to be disappointed."

Because of post-9/11 security restrictions, most of the ORNL site, including employees' offices, will not be open to access for office or Lab visits. All Community Day visitors, including badged staff members and their family members, will need to register to attend the event. Employees can sign up themselves



ORNL's new east campus is the focal point for August 27's Community Day. Tours to the Spallation Neutron Source are also being offered to visitors.

cultural diversity. Bus tours to the SNS will leave every 15 minutes during the course of the day. No need to pack a lunch—Buddy's Café will be open for business. Activities for kids are also planned.

Hours for Community Day will be 9 a.m. to 3 p.m. Only the east vehicle entrance on Bethel Valley Road will be open for admitting Community Day visitors. The entrance will be open to admit visitors from 8:30 a.m. until 2 p.m.

Registrations are requested by August 4. Register on-line at www.ornl.gov/community_day

Call for Volunteers

Putting on a Community Day takes planning and teamwork. August 27 will also require a host of volunteers to make things go smoothly. Roles requiring volunteers are coordinators,

hosts, herders, tour guides and runners for the general legwork involved in a public event. All voluntary efforts will be on a nonpaid basis. If you'd like to help out as a volunteer for all of some of the August 27 event, contact Brenda Hackworth, hackworthbt@ornl.gov, 241-7249.

Register in advance

Registering yourself and guests on-line at www.ornl.gov/community_day will speed processing for Community Day. However, if you aren't a computer user, mail the following information for each attendee to Brenda Hackworth, ORNL, P.O. Box 2008, Oak Ridge, TN 37831-6266 by August 4, 2005.

- Name
- Address
- Phone No.
- Date of birth
- Place of birth
- Citizenship
- Social Security No.
- Email address (You will receive a confirmation of your registration by e-mail; otherwise it will arrive by post.)
- Would you like to take a one-hour bus tour of the Spallation Neutron Source?

Sign up: www.ornl.gov/community_day

and family members on-line at www.ornl.gov/community_day.

There are very few restrictions on foreign national visitors to Community Day, as long as they register for the event and give the requested information.

It will be the first open house for ORNL since 1997. Visitors who last saw the Lab then might feel a bit disoriented on August 27—the former east parking lot is now the site of three sparkling new facilities that stand in marked contrast to the facilities of the pre-modernization ORNL.

For visitors, the Research Office Building's Main Street area will be festooned with exhibits and displays of the Lab's science and

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As ORNL emphasizes vehicle and pedestrian safety, Facilities & Operations Jim Davis takes the wheel of the Shipping Departments's van.

Barreras named interim HR director

Lori Barreras, who has been on several weeks' assignment from Pacific Northwest National Laboratory, has been named ORNL Human Resources interim director. Lori joins the Leadership Team, reporting to Lab Director Jeff Wadsworth, with full authority for all Human Resources matters. A search for a permanent director should be completed by October.

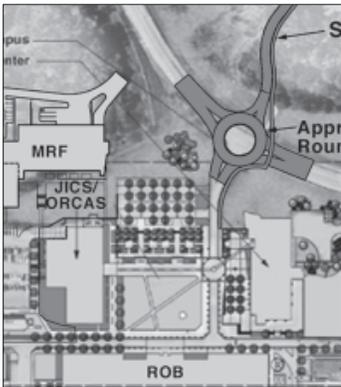


Barreras

Lab Notes

Around we go, slower, safer

This summer's construction at the east campus main entrance is transforming the former traffic-light intersection to a modern, single-lane roundabout. Planned by the Facilities Development Division, the roundabout is designed to reduce traffic congestion and increase intersection vehicle capacity, decrease starts and stops by 50 to 75 percent, reduce traffic speed and frequency of collisions and increase pedestrian safety, according to the Facilities Development Division's Norm Durfee.



The roundabout will replace the intersection at the east campus main entrance.

Long familiar on European streets, roundabouts are coming into vogue in American cities as planners seek to calm traffic at increasingly busy intersections.

In fact, officials in nearby Maryville plan to replace an awkward five-point intersection with a traffic circle.

They work because traffic only goes one way, counterclockwise, within the circle. Entering vehicles yield to those inside as they make right turns into the flow of traffic. Exiting vehicles make right turns into the outgoing lanes. A single lane of traffic and the absence of left turns makes it easy to quickly become comfortable with the new roundabout.

Pedestrian traffic is expected to increase at the intersection after the construction of a new 400-space parking lot across Bethel Valley Road from the Visitors Center, says FDD's Lanny Bates. As Bethel Valley Road becomes more friendly to bikes and pedestrians, Norm and Lanny believe the slower speeds and increased driver attention brought by a roundabout can mean safer travel for everyone.

Bridge memorial to a bridge builder

Highway 62's Solway Bridge, crossed daily by a number of ORNL commuters, is now the Dr. Herman Postma Memorial Solway Bridge. The span has been renamed to honor the late Lab director and Oak Ridge community leader.

ORNL Director Jeff Wadsworth noted in a message to ORNL staff members that the memorial is "a fitting tribute to the legacy of wonderful man who spent much of his career building bridges."

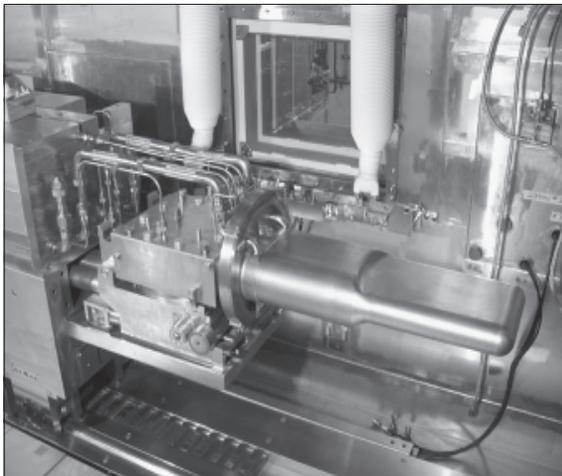
Knox County Mayor Mike Ragsdale echoed the sentiment at the June 17 dedication ceremony, saying, "Dr. Postma was building bridges in this community for many years. The bridge we're dedicating connects two great communities."

Postma's major accomplishments included beginning the technology transfer group at ORNL, spearheading the International Friendship Bell project and providing stability as the Lab transitioned from the Atomic Energy Commission to the Energy Research and Development Administration to DOE in the 1970s. He served as ORNL director from 1974 until 1988 and died last year.

SNS target on time, on target

Time marches on, and so does the Spallation Neutron Source. With completion looming next year, the SNS's target module has been installed, meaning the linac and accumulator ring system now has something to shoot its protons at.

The target will receive the protons in pulses at the rate of 60 times a second, "spalling" off neutrons from the circulating mercury inside. The target system contains



The Spallation Neutron Source's target module, *in situ*.



Curtis Boles

Philip Khinda, Pamela Postma Khinda, Pat Postma, Thomas and Matthew Khinda and family friend Pete Craven pose with a sign honoring Herman Postma, shown in top photo at ORNL's 60th anniversary celebration in 2003.



20 tons of mercury, which sounds like a lot. It isn't.

"The 20 tons represents only about a cubic yard," says the Experimental Facilities Division's Ian Anderson. Mercury, a comparatively heavy element, is rich in neutrons, which is its advantage as a target medium.

"The other advantage of mercury is that it's liquid, so it is its own coolant," Ian says. "Up until now neutron sources have used solid metal targets, and when you get to high powers you have to remove the heat using water cooling, which restricts the power. With mercury, you get no dilution."

This target module is currently the only one of its kind, but not for long. The modules are designed to run "until destruction" and will be replaced four times a year, a process that takes two weeks as the module is rolled into a service area and the mercury is removed.

What is an SNS target module worth? Ian says they'll run at about a half-million bucks apiece.

Reported by Bill Cabage and Eva Millwood

Annual roundup corrals grounded geese

Bright and early on June 23 and 24, about 30 DOE, Tennessee Wildlife Resource Agency, U.S. Department of Agriculture and ORNL employees and volunteers gathered to take part in the annual Canada goose roundup on the ORR. Two hundred fifty-one geese were captured on ORNL, Y-12 and ETTP grounds; most were weighed and scanned for radioactive contamination and 206 were given new leg bands by the USDA.

The roundups are done in the early summer to coincide with the brief flightless period of the geese brought about by the molting of their outer wing feathers. Their inability to fly provides an opportunity to gather them in an orderly and calm manner.

“Roundups are done slowly and methodically to limit stress on the birds,” says Neil Giffen of the Environmental Sciences Division. “We are not chasing the birds, but slow-walking them into enclosures.” Giffen adds that wildlife officials and all others involved are trained in humane treatment methods and handle all birds “with the utmost of care.” Fans

and water cool the birds held in trailer-size cages for radiological scanning. They are constantly monitored until their release on the ORR or another site designated by the U.S. Fish and Wildlife Service.

Of the 251 geese rounded up, 167 were screened for radiological contaminants and 116 were relocated to the Hiwassee Wildlife Refuge in Meigs County, Tenn., with hope that they will establish residency there. The others were released either at Freer’s Bend or their sites of capture. None were found to be contaminated with radioactive substances.

Done through the state to monitor Canada goose populations, the roundups provide information on goose movements throughout the U.S. and data on resident populations.—
Eva Millwood



Eva Millwood

Environmental Sciences Division summer students Erica Lewis (left) and Meghan DeFord count the caged geese for the roundup records.

Safety rolls both ways as cars, cyclists share Lab’s roads

Summer weather, student interns and a new fitness focus mean one thing at ORNL: more bicycles on the road. ORNL’s commitment to safety extends beyond the laboratory, and with an increased number of two-wheeled commuters and a more bike-friendly Bethel Valley Road, safety for cyclists is more important than ever.

Motorists and cyclists share equal responsibility for maintaining safe roadways, and laws and regulations governing bicycles are often misunderstood. Although they are a clean, convenient and responsible mode of travel on a crowded campus, their size (smaller than automobiles) and speed (usually slower than automobiles) call for preventive measures that drivers and cyclists must take to ensure safety on the roads.

In a past *ORNL Reporter*, the Nuclear S&T Division’s Ray Brittain offered tips for drivers and cyclists to make sharing the road a little easier:

Safety tips and requirements for cyclists

- Always wear a helmet. This is your most important piece of safety gear, protecting your most important piece of equipment—your brain.
- Be alert. Always be aware that a motorist might not see you.
- Signal your intentions—use hand signals to indicate turns and stops.
- Use a mirror. This allows you to be aware of traffic approaching from behind.
- Follow traffic rules as if you are driving an automobile. Ride with traffic, not against it.
- Ride as near to the right-hand side of the road as practical, while avoiding road hazards that could cause you to swerve into traffic or lose control.
- Be predictable. Do not weave in and out of traffic or parked cars.
- As is the case with all slow-moving vehicles, you are required by Tennessee law to pull off the roadway when more than five vehicles are unable to pass.
- Pedestrians have the right-of-way on the ORNL campus.

Safety tips and requirements for motorists

- Be alert. Like motorcycles, bicycles are harder to see than autos.
 - Don’t honk. This can startle a cyclist and cause him or her to swerve.
 - When passing, be sure to clear the cyclist before moving back into your lane.
 - Cyclists who are not on the extreme right-hand side of the lane are not being careless, but are in fact attempting to avoid hazards that could cause an accident.
 - No cyclist’s speed can be taken for granted. With today’s improved equipment, some bicyclists may be traveling 25 or 30 miles per hour, if not faster. Others will be traveling at much slower speeds.
 - Drivers turning left in front of oncoming cyclists cause a large percentage of car-cycle accidents.
 - Overtaking, then making right turns in front of cyclists also causes many accidents.
- Remember: in the event of even a minor collision, cyclists are much more likely motorists to suffer serious bodily harm. Even if you must yield to a driver or cyclist who is not following the rules, driving and riding defensively is key in avoiding accidents. —*Eva Millwood*



Bill Cabage

Communications and External Relations summer intern Eva Millwood, who wrote most of this issue, arrived from the University of Tennessee with her bike.

Lab welcomes 2005's influx of summer students

Nearly 300 summer students arrived at ORNL, swelling the ranks of cafeteria and parking lot patrons as they spend an unforgettable term in a national lab R&D environment. Welcome to the students listed here by host division.

Chemical Sciences Division: Carol Pham, Daniel Shoemaker, Dustin Travaglini, Miao Yu, Namita Bisaria, James Bradshaw, Chia-Hung Hou, Evan Nagler, Cameron Price, Ivana Semova, Christine Shook, Yuchen Lu
Communications and External Relations: Eva Millwood

Computational Sciences and Engineering: Aaron Myers, Karin Turner, Karen McNeany, John Knox, Robert Feierabend, Kathleen Abercrombie, Hannah Flath, Phillip Martin, Fredrick Rogers, Rodney Wright

Computer Science and Mathematics: Brittany Hagen, Judy Evans, Dominic Biava, Jiangtian Li, Erica Zuhr, Collin McCurdy, Eric Grobely, Nithya Vijayakumar, Avital Braiman, William Wells, Berkin Ozisikyilmaz, Zizhong (Jeff) Chen, Brittany Hagen, Wesley Bland, David LaBissoniere, Joshua Stratton, David Worsham

Condensed Matter Sciences: Matthew Musgrave, Christopher Bledsoe, Jeremy Jackson, Brandon Killian, Bethany Spencer, Alaska Subedi, Roy Dar, Timothy Pennycook, Divya Singh

Engineering Science and Technology: Samuel Golbuff, Hyeun Jun Moon, Benjamin Sovacool, Sarah Wegrzyn, Lewis (Derrick) Preston III, Shawn Henry, Ryan Lee, Marcus Allegood, Sebastian Chialvo, Richard Clark, Jeanne Duce, Bryce Hudey, Evan Markel, Colin McClelland, Robert Moore, Shane Morrison, Benjamin Rudolph, Wei Tan, Alexander Scott, Robert Jeffers, Kelly Christian, Prishantha Dunstan, Tyler Kohlbusch, Noah Bergeron, Dustin Garvey, Stephen Bernard, Russell Dunlap, Matthew Sooter, Kirk Lowe, Timothy Burress, Brett Carmichael, Azam Syed, Matthew Fields

Environmental Sciences: Emmanuel Isang, Sarah Lewis, Moqin (Michelle) Yu, Bryan Murphy, Samuel Freyaldenhoven, Douglas Aaron, Peter Anthopolos, Christina Champion, Benjamin Clemens, Todd Fleming, Kimberly Hand, Megan O'Shaughnessey, Ernie Perez, Angela Reevely, Kristen Reeves, Enid Rodriguez, Ashley Vollmar, Amy Voss, Sarah Woods, Wenlu Xiong, Jennifer Xu, Jessica Adams, Joyce Arcangeli, Richard Dilling, Elizabeth Zhou, Katrina Cox, Cristina Carbajo, Cloe Luckett, Colleen Iversen, Andrew Zurawski, Molly Brown, Xiaochao (Charles) Guan, Meghan DeFord, Stacy Evans, Erica Lewis, James Scott, Jacob Fischer, Sara Jawdy, Katherine Sides, Willis Shem, Anniece Weaver

Facilities Development: Ryan Bachor, Fahren Ferguson, Matthew Chandler, John Niemann, Lori Mason, Elise Campbell

Fusion Energy: Jennifer Carney, Ryan

Moore

Integrated Operations Support: Amy Basham, Scott Wilson

Life Sciences: John Wheeler, Qin Yu, Rachel Hettich, Sean Moffitt, Whitney Ridenour, Ariella Barhen, Sarit Barhen, William Dabbs, Mark Fisher, Amanda Land, Leanna Horton, Sarah Armel

Metals and Ceramics: Todd Johnson, Eduardo Aramayo, Thomas Battiste, Deborah Carlson, Carlos Correa-Lockhart, Matthew Dwyer, Aaron Ferber, Paul Fikse, David Gettman, George Nelson, Katharine Ogle, Keith Ottinger, Nathan Ottinger, George Pharr, Zachary Pramann, Stacey Raden, Isaiah Ruffner, Brian Sanders, Cory Stinton, Benjamin Stratton, Zachary Vane, Brie Witherspoon, Ling Xu, Reeshemah Burrell, Barton Bailey, Greg Engleman

Networking and Computing Technologies: Thomas Daly, Stephanie Mitchell

Nuclear Science and Technology: Karmen Smith, Kun Li, Henry Lovett, Sean Terrill, Linda Carter, Rodolfo Ferrer, Robert Joseph III, Susan King, Megan Pritchard, Rachel Slaybaugh, Stephanos Tongelidis, Alexander Urashkin, Jonathan Waldes, Sergiy Lobach,

Michael Wenner, Zhaopeng Zhong, Justin Clarity, Quan Cohen, Melissa Crawford, Jerrad Deason, Carol Dudney, Daniel Gill, Nathaniel Goss, Vernon Guthrie, Jr., Marcus Jackson, Racheal Martindale, Steven Saavedra, Denise Schuh, Susan Williams, Ryder Winck, Aaron Woods, Eric Wright, Shannon Wroblewski, Patricia Taboada Serrano, Shengjun Zhang

Operational Safety Services: Daniel McNeely

Physics: Aaron Havener, Rick Carroll, Carlos Ortiz, Zachary Owens, Devon Goforth, Leann Erbsen

SNS Accelerator Systems: Amelie Gilman, April White, Aaron Vincent, Crystal Blickley, Irina Puchkova

SNS Project and Site Support Office: Jonathan Swanks

SNS Directorate: Joshua Wilson, Ekaterina Danilova

SNS Experimental Facilities: Ariel Ruffin
Stewardship Program: Carlo Domizioli, Abigail Gaddis, Joshua Howard, James Jaucody, Matthew Porter-Peden, Brad Schwer, Mark Sikora, Nathaniel Smith, Lucas Snyder

Campers

Continued from page 1

nitrogen and potato-gun pyrotechnics.

Christina Wright has been working with ORNL Science Explorers for about five years. She says that she hasn't seen any decline in the enthusiasm of the campers.

"We had a kid here the first day who was so tired he couldn't keep his eyes open," Wright says. "He told us that he was so excited the night before that he couldn't sleep."

Headquartered at the historic cabin at Freels Bend, the camp is situated in a prime spot on the Oak Ridge Environmental Reserve. Campers split up into five groups of five each week, and begin every day as Habitat Hunters, searching for signs of wildlife and sometimes witnessing wildlife in action.

Wright adds that camps in the past years have seen some pretty spectacular scientific events, including nesting turtles and an osprey that was training its chicks to fish in a nearby pond.

"The osprey parent would fly from its post, go get a fish, fly back and show it to the babies. Then it flew back to the pond and dropped the fish back in," Wright said. "It did that probably three times, showing its babies that's how it's done."

"Kids don't get to see that every day."—*Eva Millwood*

Secure

Continued from page 1

obviously not going to apply."

Jennie Froelich, a first-year graduate student at Michigan State University, was an undergraduate scholarship student last year and was awarded a graduate fellowship this year. "If you have the scholarship, it's in their best interest to keep you," Jennie says. As students advance in their studies, the research methodology changes too. Jennie says that her experiences this year are more hands-on than last year, and working closely with a post-doctoral student every day, like she does this year, is "extremely helpful."

"The point of having us come here is to show us what it's like, so we can cater our research to areas more like these projects," says Stacey, whose work here could possibly even lead to a change in her thesis. "We're right here at the beginning of all this."

She and Caleb are involved in a project tracking simulated contamination from dirty bomb, a relatively recent focus of defense research worldwide.

Stacey does the air modeling, and Caleb does the land, and it's obvious how successful the program is with matching compatible students and programs—they are both sitting down explaining their work for this article when Caleb stops in mid-sentence, excuses himself, and turns to Stacey to ask a question that's popped into his mind. Even outside of the lab they're always primed for epiphanies, and it is reassuring to see this next generation of scientists heading to the fore of national security.—*Eva Millwood*

Homegrown

Plants adorning the new east campus have an East Tennessee look and feel

As construction on the east campus quadrant, or “quad,” nears completion, ORNL employees and visitors may be completely unaware of some of the design’s most significant elements.

Hawkins Partners, the Nashville landscape architecture firm carrying out the project, drafted a 10-year plan in 2001 that incorporates low-maintenance, sustainable elements into the otherwise typical construction project.

Beneath the surface of the Visitor Center’s parking lot and the sod of the quad commons lies a passive rain-distribution system that

Planners hope that using native plants will establish an aesthetic that embraces the biodiversity of East Tennessee.

collects rainfall and directs it below the lot and through pipes to the grass. The composition of the lot, a combination of gravel and pervious concrete, a porous concrete-like material that allows water to pass through, prevents rainfall from sheeting off of the surface into stormwater collection systems and instead routes the water to the grassy areas directly below, eliminating the need for artificial

irrigation.

Low-output bollard lights provide illumination in the lot. Because the beams are directed downward, they emit less light pollution than conventional lighting systems.

“The long-range master plan set a pattern that became criteria for future landscaping,” says Norm Durfee of the Lab’s Facilities Development Division.

The majority of the trees and shrubs in the landscaping pattern are locally native and were chosen from a vascular plant database, compiled by the Environmental Sciences Division, of plants that can be found on the Oak Ridge Reservation.

Planting native plant species is the clear choice to meet campus needs, because native plants are better adapted to local conditions



Eva Millwood

Facilities Development Division’s Norm Durfee explains the use of native plants and low-output lighting on ORNL’s new campus.

and require much less maintenance than their exotic counterparts, Norm says.

Planners hope that using native plants will establish an aesthetic that grounds the Laboratory to its surrounding environment and embraces the biodiversity of East Tennessee. This fusion, Norm says, will underscore and promote ORNL’s commitment to the environmental stewardship.

Trees and shrubs in the central quadrant, sidewalks and parking lot near the Visitor Center will serve multiple purposes. As native plants, they provide habitat for native birds and insects and promote a more natural balance in the underlying soil. Also chosen for their botanical structure, they will shade crucial sections of the concrete sidewalks, parking lot and buildings to reduce sun exposure and increase cooling efficiency in hot weather and to provide an insulating buffer in cold weather.

Visitors will appreciate the Nuttall oaks planted between parking spaces in the Visitor Center’s parking lot as the trees’ eventual 38-foot diameter shades the vehicles parked below. The trees will also provide acorns for the Lab’s squirrels and birds.

Planners also chose smaller shrubs and bushes around windows and seating areas, like mountain laurel, bee balm and hydrangea, for their flowers and the butterflies and insects that the flowers attract. Redbuds, fragrant sumac and black-eyed Susans, all of which grow wild on the ORR, round out the collections of blooming plants bordering the Joint Institute for Computational Sciences building.

Visitors and employees alike will find the campus a more pleasant place to be as the new botanical additions and efficiency-boosters settle into their inconspicuous roles.—Eva Millwood



Eva Millwood

Nashville Natives’ Karen Estevez-Gill plants violets and other perennials around the RSC pond.

Pond plants go native

Landscapers from Nashville Natives planted more than 1,000 native wildflowers along the South shoreline of the RSC pond on June 27 and 28. Among the varieties planted are wild columbine, wood aster, butterflyweed, purple and upright coneflower, black-eyed Susan and blue violet.

The majority of landscaping around the Research Support Center’s pond, Visitors Center, East Campus Quad and the waterfall involves native plants. They are biologically suited to the local climate and soil and attract indigenous birds and insects.

SNS celebrates 4 million-plus safe construction hours

Employees, subcontractors and managers of construction at the Spallation Neutron Source facilities gathered June 22 to celebrate 4,056,000 labor-hours of work without any lost-time accidents.

A surprise was the presence of Pat Dehmer, director of the DOE's Office of Basic Energy Sciences, the Office of Science program that oversees the SNS.

"I've never been associated with a project that's elicited as much admiration and awe as this one," Dehmer said, citing that the 25-year span of lobbying for, planning and constructing the site is nearing completion. "This place

is going to transform science."

"The purpose of this celebration is to thank everyone who's been a part," said Dick Davis, former project manager for the Knight-Jacobs joint construction venture. "Safety is part of the culture of construction and the culture of union and leadership folks."

Since construction began in 1999, 70 contracting companies have hired more than 4,000 construction craftspeople to work at the SNS site, where completion of the facilities is projected for 2006. Currently, the concrete and steel structures have been finished, and installation of electric wiring, technology and

mechanical equipment is under way.

Tennessee union leaders were present to offer congratulations for the diligence and caution exercised by participants on all sides of the project.

"Not too many years ago, the expectation for fatalities on this kind of job was pretty high," said Jerry Lee, president of the Tennessee AFL-CIO Labor Council. "It benefits everybody when you go home with all your parts and pieces."

The benefit came in the form of an extra-long lunch break during the ceremony and catered Calhoun's Restaurant barbecue for each of the approximately 700 construction craftspeople present.

Bob Holt of Jacobs Engineering left the crowd with an encouragement to continue the tradition of safety even after work on the SNS is finished.

"Take this work ethic with you to your next project," Holt said. "Insist that every project you work on is as safe as this one."

Workers at the SNS acknowledge that the scale of the project and culture of safety create a different environment than typical short-term jobs.

"When I got here at the beginning, there was nothing but a water tower and a path," said Tresse Hicks, an electrician and member of the Knoxville Local 270.

"It's very unlike the private sector. Here everything's site-specific, and I've learned so much doing lots of different jobs," Hicks said.—*Eva Millwood*

M&C's Goyal chalks up 50 patents

Amit Goyal, leader and task manager of the Superconducting Materials Research Program in the Metals & Ceramics Division, is now inventor on 50 issued patents following the U.S. Patent Office's issue on June 7 of the latest patent in a portfolio of processes and products relating to superconductor development.

Amit is a Battelle Distinguished Inventor (being an inventor or co-inventor on 14 or more patents) and has worked at ORNL in the field of electronic materials since 1991. He was issued his first patent in 1998. The majority of his 46 U.S. and four international patents are for processes and materials used in superconductivity applications.

"A patent alone is worthless," Amit says. "The key is creating a patent portfolio that provides coverage for all aspects of the



Goyal

process."

He is the lead inventor of the RABiTS (rolling-assisted-biaxially-textured substrates) fabrication process, which is the Lab's dominant superconductivity project and has been the dominant process in the development of high-temperature superconductors worldwide. Consisting of a base metal tape and a chemical buffer layer of palladium or a metal oxide, the RABiTS substrate allows the superconducting material yttrium-barium-copper-oxide (YBCO) to be highly aligned in all directions, which is crucial for efficient current flow through the superconductor.

Amit is a fellow of the American Association for Advancement of Science and the World Innovation Foundation. He serves on the editorial and advisory boards of several international journals and is an author or co-author of over 280 papers in journals and conference proceedings. He has received numerous Laboratory and external awards of excellence, and has given five plenary and over 100 invited talks in national and worldwide conferences.

Dale's book describes Mt. St. Helens' comeback

Twenty-five years after the eruption of Mount St. Helens, a new book describes the thriving re-establishment of plants and animals there.

The Environmental Sciences Division's Virginia Dale, one of the book's co-editors, began studying the mountain's terrain days after the 1980 event and has returned many times since. She said the re-establishment of life has been surprising.

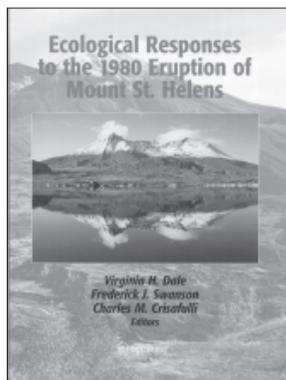
"We found that in some places there had been a great deal of survival—for instance under snow packs," Dale said. "In the places where many of the plants and animals had been wiped out, they quickly came back and in an order that was

not predicted by ecological theory."

Dale said Mount St. Helens has given scientists insights on plant and animal survival.

"What is most interesting today at Mount St. Helens is the complexity of life that occurs there," Virginia says. "By complexity, I mean that there aren't just a list of animals and plants that are there, but there are many ecological interactions."

Ecological Responses to the 1980 Eruption of Mount St. Helens, published by Springer, was co-edited with Virginia by Frederick J. Swanson and Charles M. Crisafulli.—*Fred Strohl*



Service Anniversaries

July 2005

45 years: John W. McKeever, Engineering Science & Technology

35 years: R.W. Reed Jr., Metals & Ceramics

30 years: Brad Weil, Nuclear Science & Technology; John Martin Cole, Physics; W. Doyle Garrett, Fabrication; Donald Ray Jenkins, Craft Resources; Alvin Eddie Baird and Gary L. Cooper, Craft Resources; John E. Capshaw, Logistical Services; Thomas V. Dinsmore, Engineering Science & Technology; Steve L. Allman and Elizabeth T. Owens, Life Sciences

25 years: Keith Sherman Joy, Quality Services Division; Robert B. Shelton, Energy & Engineering Sciences; Jerry Dean, Audit and Assessment; Stephen H. Stow, Communications & External Relations; Jamie M. Johnson, Networking & Computing Technologies

20 years: Brenda Jeffers Johnson, Nuclear Science & Technology

R&D 100s reflect Lab's medical, energy, industrial tech

ORNL researchers and engineers have won three R&D 100 Awards, presented each year by *R&D Magazine* in recognition of the year's most significant technological innovations.

With these three awards, ORNL's national lab-leading total increases to 122 and is second only to General Electric. Lab Director Jeff Wadsworth notes that the honors demonstrate the relevance of research taking place at ORNL.

"I am absolutely delighted that ORNL staff members have won three more of these prestigious awards," Jeff says. "The fact that we have both repeat winners and first-time winners is an impressive statement about the depth of the laboratory's scientific talent."

The honors were for the following inventions:

SEMCO Revolution, developed by Jim Sand of ORNL's Engineering S&T Division and John Fischer of SEMCO.

The Revolution is a rooftop air conditioner that can independently control humidity and temperature while delivering any specified percentage of outdoor air into commercial and institutional buildings. Compared with conventional air-conditioning hardware packages, the Revolution is more compact, cost-effective and energy-efficient. The Revolution's flexibility allows operators to easily comply with building ventilation codes and maintain specific indoor humidity levels for hospitals, theaters, hotels and schools. Better control of humidity levels helps control mold and mildew that can cause long-term health and indoor air quality issues.

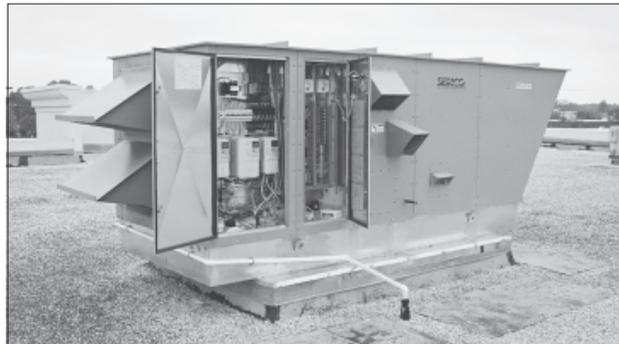
SensArray Integrated Wafer, developed by Robert Lauf, Don Bible and Carl Sohns of

ORNL's Engineering Science and Technology Division (all repeat winners) and Wayne Renken, Earl Jensen, Brian Paquette, Jeff Parker and Jim Barnett of SensArray.

The Integrated Wafer system is a tool for monitoring temperatures during the manufacture of semiconductors. With each generation of microprocessors, circuit features are shrinking at the same time that wafer size is increasing (from 200 millimeters to 300 millimeters), and the single biggest variable influencing the profit margin of a fabrication line is the number of good die per wafer. That yield depends on maintaining precise, uniform temperatures across the entire heating-zone elements during processing. The wireless Integrated Wafer system fulfills the need for a temperature-mapping tool that collects thermal data without disturbing the environment of the highly automated modern production path. The wafer can return a contour map of temperature data to show hot or cold spots on bake plates, analyze trends in temperature and create an animated movie of temperature variations over time.

SeizAlert, developed by ORNL's Lee Hively and Kara Kruse of the Computational Sciences and Engineering Division, Vladimir Protopopescu of the Computer Science and Mathematics Division (a repeat winner) and Nancy Munro of the Life Sciences Division.

SeizAlert is a low-cost compact wearable prototype device designed to alert the wearer and medical personnel of an impending epileptic seizure. In a real-life implementation,



ORNL and SEMCO's Revolution rooftop air conditioner, one of the Lab's three R&D 100 Award-winning technologies, offers better control of humidity, improving indoor air quality.

the alerting device would obtain electroencephalogram data from wireless sensors on the wearer's scalp and transmit that data to a device that interprets this information in real time. Because epilepsy afflicts millions of people in the United States alone and many cannot be treated with medication or surgery, SeizAlert has significant medical, scientific and economic importance.

"These awards demonstrate that DOE scientists and researchers are hard at work developing the technologies of the future," says Secretary of Energy Samuel W. Bodman. "In the past, breakthroughs like these have played an important role in both our economic and national security." —*Reported by Ron Walli and Eva Millwood*

Reporter

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UT-BATTELLE