

## Grip on the grid

### ORNL calls on portfolio of power system research

When the lights went out in the Northeast and Midwest on August 14, ORNL researchers were presented with a variety of requests. Several appeared on local TV, called upon to describe power-grid-related research already under way at ORNL. Other requests, such as congressional briefings on which ORNL capabilities and developments might prevent another occurrence, put several ORNL researchers in the spotlight, showcasing ORNL capabilities and expertise.

From hastily called meetings directly after the event to more organized assemblages, researchers are discussing a range of subjects including high-capacity conventional and superconductivity transmission cables, distributed generation, reducing peak load through energy efficiency and demand response programs and regulating response to power failures or emergencies. The requests for interviews, consultations and hands-on help continue.

One consensus is that the power outage of 2003 will prompt a top-to-bottom re-examination of utility energy production, transmission and distribution. The transmission system, according to Brendan Kirby, is very stressed.

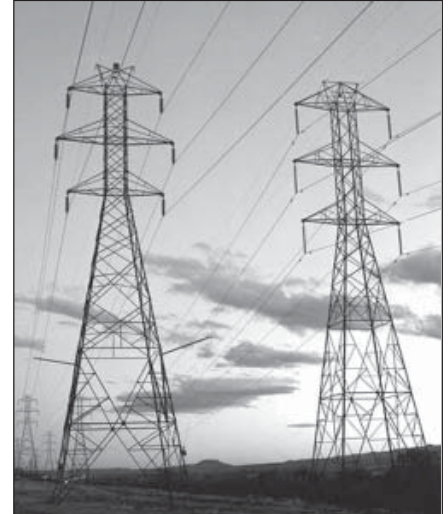
Kirby, of the Engineering Science and Technology Division was lead author of "Reliability Management and Oversight," one of six issue papers included in a grid study report written in 2002.

Where does ORNL stand with research and technologies to help solve a problem of importance to all—energy supply reliance?

The answer covers many categories—distributed generation, superconducting and other high-capacity wires and grid modeling among them—that build on long-time missions at ORNL in energy efficiency and renewable energy, next-generation nuclear and fusion energy.

Some ORNL projects include

*Distributed Generation* (the on-site production of electricity using fuel cells, microturbines, renewable electric systems and other "prime movers.")—ORNL is working with the Verizon Company on two projects to keep nationwide telephone service operating during a power failure. ORNL is also working with the Connecticut Broadcasting System to develop a distributed power system pilot to transmit its signal during a power failure. This project is expected to be operational in 2004



The Northeast's August 14 blackout has focused the nation's attention on power transmission.

and may have applications for the entire communications industry. A distributed generation system was installed in a Hilton Hotel in Indiana last year and has been used during several power failures.

*Superconductivity* (Superconducting wires

(See GRID, page 7)

## Area students experience science

The Oak Ridge Reservation's Freels Bend is home to many spectacular sights—a 200-year-old cabin, a soft-shelled turtle laying her eggs and children learning about all kinds of science.

In 1989 the Ecological and Physical Sciences Study Center, established by Oak Ridge National Laboratory in 1986 at Freels Bend Cabin, began offering children the

opportunity to attend the week-long ORNL Science Explorers Camp. Rising fourth, fifth, sixth, and seventh graders attended sessions from June 9 to June 27 this summer.

Kris Light, the science room coordinator at Willow Brook Elementary School in Oak Ridge for grades K–4, taught her 14th science camp this year. Although she teaches outreach classes similar to those given at camp during the regular academic year, she finds each summer's experience rewarding.

"I've done every single camp they've ever had, and it is fun to work with the kids," Kris says. "I like to share my love for nature."

Kris presents children with opportunities to learn about a range of topics each day, from hurricane tracking and stream ecology to habitats and microscopic pond organisms.

"I like doing habitat hunters best," says sixth grader Hilde Oliver of Robertsville Middle School in Oak Ridge, "because you get to learn about all types of animals that you've never seen before."



Jim Richmond

A summer science camper experiences the world under a microscope.

(See SUMMER, page 6)

### Science education opportunities year-round

Opportunities for science enrichment for area students are available year-round through ORNL-sponsored programs. The Ecological and Physical Sciences Study Center affords study units throughout the school year. Study units cover math, physical science and life science. Units are taught at a variety of locations including Freels Bend Cabin, area schools and the American Museum of Science and Energy. Study Center instructors have a broad base of scientific, mathematical and technical knowledge.

Although summer camps and science academies are over for 2003, it is never too early to plan for next season. For more information or to schedule a class, contact Gail Beyersdorf at 241-9515 or beyersdorfvg@ornl.gov.

# 'In theory,' CNMS will draw scientists from around the globe

Ground has just recently been broken for the Center for Nanophase Materials Sciences, but ORNL is already preparing a base of collaborating scientists who will push the boundaries of nanoscale research in the coming years.

ORNL held two workshops at Pellissippi State Community College in August to brief a group of researchers, many of them students and postdocs, on the computational nanoscience tools the Center for Computational Sciences will make available to them when the Lab's nanoscale research center is completed in a couple of years. The CNMS and CCS are both funded by DOE's Office of Science.

The workshops, sponsored by the CNMS and CCS, focused on the theoretical aspects of nanoscience—an important area of research that will rely heavily on the Lab's computational simulation prowess.

"Here they've learned simulation methods

for nanomaterials and about the simulation tools—the source codes to perform the simulations," says the Computer Science and Mathematics Division's Thomas Schulthess, who hosted the theory workshop with M&C Division researcher and Corporate Fellow Malcolm Stocks.

"They are learning about Monte Carlo simulation on nanomaterials, both classic and quantum. Some of them will contact us with ideas on how to contribute to our tools sets, which will lead to proposals."

Monte Carlo is a centuries-old mathematical method that uses statistical sampling of data to solve complex scientific problems. Used by Enrico Fermi in the 1930s to calculate neutron diffusion, the method was formalized by mathematician John Von Neumann in the 1940s. Its use has bloomed with the introduction—50 years ago—of the Metropolis sampling scheme and the implementation of scientific computing.

The workshops were organized by the Nanomaterials Theory Institute, the theoretical arm of the CNMS, headed by Peter Cummings of Vanderbilt University, and the CCS's Materials Research Institute, led by Stocks and Schulthess, which is concerned with computing materials science.

Thomas points out that many of the attendees came from regional universities including Florida State, Alabama, Georgia and Mississippi State, as well as schools farther across the country. The CNMS will be a world-class facility, but it will be a particular boon to nanoscience in the Southeast region.

Speakers at the first theory workshop included the University of Georgia's David Landau and ETH-Zurich's Matthias Troyer. Discussions included two toolsets, PsiMag, developed at ORNL, and ALPS (Algorithms and Libraries for Physics Simulations), an aptly named product from ETH-Zurich, Switzerland.

"One of the conclusions we reached was to bring the ORNL and Zurich efforts together, which will bring international recognition and possibly researchers from Europe to the CNMS and CCS," Thomas says.

"Sometime later in the winter we will join the two development teams to see what kind of synergies we have. The interesting thing in these toolsets is that they follow the underlying generic programming philosophies of the C++ programming language, thus they'll be compatible without seeing each other. It will be easier to build modeling tools and codes that use both toolsets."

Such synergies and compatibilities, Thomas says, will result in increased collaboration across the nano theory community.

The following week's workshop, hosted by Cummings and the University of Michigan's Sharon Glotzer, centered on electronic, atomistic and mesoscale simulation methods.

Malcolm and Thomas are especially grateful to Pellissippi State for the use of their computing lab and auditorium for the workshops. ORNL will have facilities for future cutting-edge conferences with the completion of the state-funded Joint Institute for Computer Sciences and Oak Ridge Center for Advanced Studies, or JICS/ORCAS.—*Bill Cabage*

## ATLC, UT-Battelle win partnership award

The Atomic Trades and Labor Council (ATLC) and UT-Battelle have been awarded this year's Horizon Award at the annual Tennessee Labor-Management Conference.

The award, which recognizes labor-management partnerships toward community service in Tennessee, results from volunteer efforts in helping East Tennessee residents recover from a November 2002 tornado outbreak.

ATLC workers, aided by equipment made available by UT-Battelle and DOE, went to Cumberland County shortly after the tornadoes to clear debris that was hampering recovery efforts. ORNL employees donated \$16,000 to recovery efforts.

In the spring employees volunteered to build

a Habitat for Humanity Home in Morgan County, which was particularly affected by the twisters.

"The ATLC and UT-Battelle are both dedicated to serving the community," says ATLC Vice President Ed Mee. "We saw people who needed help, and we responded. These were the volunteer efforts of the employees, who came out in force to help the people affected by the storm."

"ORNL is dedicated to being a good citizen in the area, and the efforts of the ATLC and Team UT-Battelle are very important to that goal," says ORNL Director Jeff Wadsworth. "This award is well deserved. ORNL staff members should be very proud of what they do for the community." —*Bill Cabage*



is published for the employees and retirees of Oak Ridge National Laboratory, which is managed and operated for the U.S. Department of Energy by UT-Battelle.

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Curtis Boles

Dorothy Tate of the Fusion Energy Division was one of many staff members who wore ethnic garb to the International Festival for the United Way. Story on back page.

## New Employees

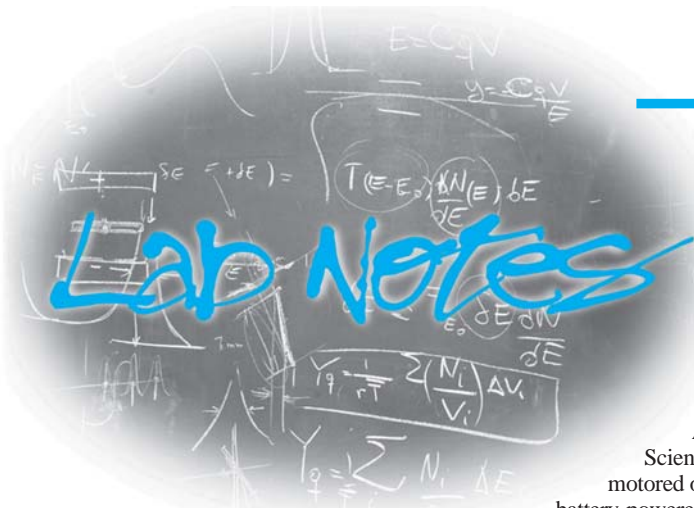
Veerathy Chakravarthy, Computer Science & Mathematics Division

Radu Custelcean, Chemical Sciences Division

Pamela McConkey and April Tucker, Operational Safety Services Division

Wai-Tung Lee, SNS Experimental Facilities Division

Weiju Ren, Metals & Ceramics Division



### Lights out, ideas on

When the lights went out in the northeast last month, phones started ringing at the Lab. Fusion researcher Ben Carreras received calls from several leading media outlets including *The New York Times*, *the Wall Street Journal* and the on-line mag *Slate*.

Carreras and colleagues in Fusion Energy Division have developed a computer model that simulates an electrical network operating at peak capacity and predicts the probability of a long-term blackout. Based on the model, Carreras was able to speculate to reporters what utilities with increasing demand and ever more complex power grid systems are facing.

The computer models have a quirky background. Ben and former ORNL research David Newman began the computer modeling in the 1990s by studying the behavior of piles of sand. As sand is piled increasingly higher, it starts small avalanches, a chaotic system that Ben and David used to model instability in

fusion plasmas.

Meanwhile, Brendan Kirby, a power transmission researcher in the Engineering S&T Division, was in the office on the afternoon of August 14 while, serendipitously, one of the Knoxville TV stations was broadcasting from the American Museum of

Science and Energy. Brendan motored over to the museum in his battery-powered pickup truck—some irony there—and provided local TV viewers with valuable background information on the blackout throughout the weekend. Brendan was one of the Lab’s most interviewed researchers during the recovery from the massive outage.

### Elder statesman sees the future

His job now is serving as U.S. Ambassador to Japan, so Howard H. Baker Jr. isn’t in town very often. On his most recent trip home to Tennessee, the former U.S. senator and current elder statesman was treated to a visit to the Spallation Neutron Source site, hosted by Oak Ridge Mayor David Bradshaw.

At the overlook, SNS Associate Lab Director Thom Mason gave Baker and other guests, including members of Senators Lamar Alexander’s and Bill Frist’s staffs, an overview of the SNS project. Baker took in the view and asked questions about other projects, such as ITER, the international fusion project the United States has rejoined.

Heading back to the bus, one question was directed toward the visitor: “Senator, the photographers want to know if you’ve gone digital yet.”

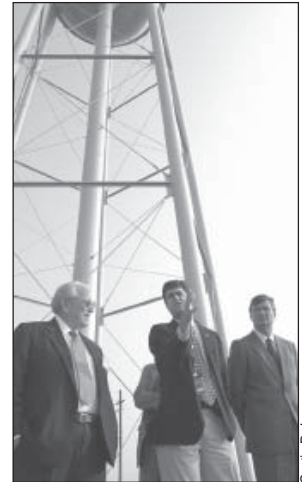
Baker, an accomplished photographer who has published several picture books, replied, “I finally did, but I put it off as long as I could!”

Baker then struck up a camera-intensive conversation with ORNL photographers Curtis Boles and Jim Richmond until time-pressed tour guide Brenda Hackworth shooed them back on the bus.

Once in the coach, Ambassador Baker sat beside the youthful SNS leader and asked, in a diplomatic way, “How old are you?”

Thom’s reply: “It depends on whether you count my SNS years double.”

*Reported by Bill Cabage*



At the SNS overlook, Thom Mason (center) and Jeff Wadsworth brief Howard Baker (left).

Curtis Boles

### Return to Gravel Hill

Christine Babb Cooper read Associate Lab Director Frank Harris’s letter in the May *Reporter* with more than usual interest. Frank described past forays into the woods around the Tower Shielding Facility, recollecting artifacts from past inhabitants of the area.



Photos by Jim Richmond

Frank’s description of the area, particularly of an old zinc-lined box in a spring, had a very familiar ring.

Mrs. Cooper’s pre-war family homestead was in that area on Copper Ridge—“Gravel Hill” they called it—home to the Babb and McKeehan families, among others. Everyone had to leave when the Manhattan Project arrived in the area in 1943.

Mrs. Cooper’s daughter is Christy Griffith of Business and Information Services. Christy

contacted retiree Bill Alexander, who in May arranged for Mrs. Cooper to visit to the log gravehouse described in the April *Reporter*. Frank arranged with Environmental Sciences Division’s Pat Parr and Environmental Protection’s Mike Finger for a second trip with Mrs. Cooper and family members. This time they would locate a home not seen in 60 years.

As the four-wheel-drives approached a dilapidated structure on July 17, Mrs. Cooper knew it was the place. She writes:

“As we drove in view of it I was as excited as a child at Christmas time. Almost all the front of the house had fallen, but the kitchen and the fireplace was still standing and the location was just as I remembered it. I pointed out to my children where each building stood, even though they were gone and I just couldn’t talk fast enough to tell them all about it. I showed them where the garden was, where our Dad’s grape arbor was—one post still standing.”

Because the farmers used durable chestnut, many features remain, although the chestnut trees have vanished. She remembers many details of her former home, down to “each piece of furniture.”

The cistern her father built at the homesite

was still there, although a tree grows through it. The zinc-lined cooler that Frank had described was used for storing milk and butter—a pre-electric fridge.



Christine Babb Cooper and the home she once knew.

“I took my last look and wondered just how life would have been for us if we hadn’t had to give our homes up,” Mrs. Cooper writes. “How hard and heartbreaking it must have been for our parents to give up their homes and start anew.”

# Pluck and skill

## Larry Anovitz is geochemist by day, luthier by night

Whether he's setting up an experiment or building a mandolin, Larry Anovitz approaches the task pretty much the same way.

In both cases, it's kind of like solving a puzzle, says Larry, a University of Tennessee visiting professor in ORNL's Aqueous Chemistry and Geochemistry Group. He has to design how the experiment or instrument should be done, then figure out the best way to build it.

"It's really a challenge, but it's also relaxing," says Larry, who has completed a mandolin and is building a violin, an archtop jazz guitar and a mandola. But with twin 4-year-old girls, Havah and Leah, Larry and his wife, Deborah Cole, have their hands full. So it will likely be a while before the violin is finished. The mandolin ended up being a two-year project, and that was before the girls entered the picture.

"I'd grab an hour here and there, so it took a lot longer than it would have if I'd had time to work on it every day," says the 44-year-old Chicago native, who converted the one-car garage of their Knoxville home into a workshop.

The mandolin, based on a Gibson F5, features inlays of mother-of-pearl and green abalone, turquoise and lapis lazuli, ebony overlays and big leaf maple back, neck and sides. The top is Engelmann spruce. The violin has a maple back, ribs, neck and scroll. The finger board is ebony and the top is spruce.

"One of my goals is to make Havah and Leah their own violins," Larry says. "The instruments would be something each of them would have forever." He and the girls are taking violin lessons, but it's a difficult instrument and it will likely be a while before they enter any fiddle contests.

His interest in woodworking began when he was a youngster and he and his dad built planes from balsa wood and tissue. They also had an entry in the Soap Box Derby. Much later, while living in Arizona, he needed a table for his computer and couldn't find anything to suit him. So he bought some

mahogany and purple heart and built a slab table that was better and a lot cheaper than anything he could buy.

About nine years ago, while on a trip to Colorado, Larry decided it would be fun to build instruments. He already played the guitar and mandolin, so it seemed like a natural extension as it combined his love for fine wood and music with his passion for building things.

There's a lot involved in building fine string instruments. Aside from all the tools — standard and specialized — there are a lot of tricks of the trade that can be acquired only with practice. Heating the wood to bend it and making molds aren't learned over night. Now he's expanding his focus to include studying the acoustics of wood.

"I've been surprised at how little is out there about how the elastic properties of wood vary with direction — along or across the grain — and how it relates to the tone produced by a given board," says Larry, as he picked up a yard stick.

Dangling it between his thumb and index finger, he put it next to his ear and thumped it with the index finger of his other hand. "Woods have different sounds. Some are brighter, or higher in pitch, than others. But each has its own very distinct sound."

"The acoustic properties of the wood can be calculated from that sound, but doing so for a material for which those properties vary with direction is somewhat more difficult, as is determining what effect that has on the ultimate sound of the instrument."

So even two violins made from the same tree will have different sounds. Most musicians know this, of course, but no one seems to have a definitive answer as to why.

Larry has master's and doctorate degrees in geology from the University of Michigan and two bachelor's degrees from the University of Arizona. One degree is in archaeology and the other is in geology.

Before coming to Tennessee in 1994, Larry was a faculty member at the University of Arizona. At UT he is a research faculty member in the Department of Geosciences. At ORNL, as a physical geochemist, he applies the methods of physical chemistry to problems of geology and geological materials.

Larry works with members of the Aqueous and Geochemistry Group to answer questions about carbon sequestration, hydrogen storage chemistry in power plants and geothermal energy. His research aims at gaining a better understanding of such things as the properties of fluids, the effects of water on corrosion of glasses, the rates of mineral reactions and surface chemistry, including issues related to reliability and efficiency in power generation.

Eventually, Larry would like to build a number of other instruments, including additional examples of the current models and instruments as yet untried. For now, though, it's a great escape from the pressures of work. Besides, while there are similarities between designing and setting up experiments and building a mandolin, you can't play "Soldier's Joy" on a diamond anvil pressure cell. *-Ron Walli*



**Some lucky musician may someday boast of owning an "Anovitz"**



**Larry Anovitz and the mandolin he made, which involved quite a bit of science.**

Curtis Bolles

## SNS first linac test on the mark

Researchers at the Spallation Neutron Source successfully accelerated a beam of negatively charged hydrogen ions through a drift-tube linac (DTL) accelerator tank on the first try. The test brought the beam energy up to 7.5 million electron volts.

The test is significant because it confirms the performance of the beam that is generated and accelerated in the SNS front end. Acceleration at small intensities showed 100 percent transmission—a second crucial milestone.

"Congratulations to the SNS team and their colleagues at Los Alamos for a job well done," said ORNL Director Jeff Wadsworth.

Tank 1 is the first of six sections of the DTL, which will be followed by linacs that will accelerate the beam to 1000 million volts. The DTLs are the responsibility of Los Alamos National Laboratory—one of six DOE labs involved in SNS design and construction. *Reported by Charlie Horak*

# ORNL researcher recalls harrowing time in Chernobyl

On April 26, 1986, radioactive material contaminated the air and land surrounding the Chernobyl nuclear power plant between Belarus and the Ukraine, both part of the then-Soviet Union. Seventeen years later the cause of the disaster is still debated. And while the memory of the accident still haunts those who lived nearby, it has not prevented people from going on with their lives.

Nickolay Lavrik, a postdoctoral research associate in the Engineering Science and Technology Division, lived approximately 50 miles from Chernobyl in 1986 in Kiev, Ukraine. He was nearly finished with his master's degree in electronic engineering and his infant son had been born only a few months before.

"We weren't really aware of the danger at first. We thought it was okay to spend a few hours outside each day," Nickolay says. "But then I started realizing the danger was very real. I was worried about my son. I had to develop my own plan and follow it."

The Lavrik family plan, like so many others, consisted of getting loved ones as far from the accident site as possible. Nickolay's son and wife traveled to a town some 500 miles from Kiev. The master's student himself did not leave Kiev because he had to finish school. To keep himself safe he minimized his time outdoors and sealed up crevices and windows to keep material from getting into his home.

"It wasn't a problem for me to stay inside,"

the current west Knoxville resident says. "But we were lucky that the wind was not blowing towards Kiev." The wind blew toward Belarus—as a result this area was exposed to much more radiation and hardship than others.

Once it was safer Nickolay's wife and son returned and he graduated from the Kiev Polytechnic Institute. The Laboratory of Molecular Electronics at the Institute of



Nickolay Lavrik in his ORNL lab.

Semiconductor Physics (ISP) hired him shortly thereafter, adding him to their research staff. There he worked on molecular electronics and microsensors technology, work that later helped him define his Ph.D. thesis in physics, which he earned in 1995 from ISP.

By the time Nickolay had earned his Ph.D. the USSR had dissolved into numerous

countries. The economy was struggling and he began to seek better opportunities for himself and his family.

In 1997 he accepted a three-year position as a research associate at the University of Illinois at Urbana-Champaign. Though he enjoyed his work in Illinois he was interested in something more long term, either in academia or in research. In 1999 he began the job he holds now at ORNL.

"I like working here," says Nickolay. "I like the scenery – the fact that there are forests and mountains. I like the people, too."

Nickolay's research at the Lab deals with the creation of innovative sensors and transduction principles, which can be used to detect chemical, biological and physical stimuli. The Uncooled Micromechanical Infrared Camera (UMIR-Cam), which he developed with a number of colleagues, is an example of such pioneering technology. The invention was one of four ORNL products to win an R&D 100 award recently.

His scientific success, however, is not what makes him happiest.

Nickolay is thankful that his family has not experienced any radiation-induced health complications. His son, who was especially susceptible at the time of the Chernobyl accident because he was so young, is a normal 17 year old.

"He's pursuing figure skating and is very interested in computer science," Nickolay says. —*Erin DeMuth*

## Pay going electronic, paper checks, stubs phasing out

Pay check information for exempt and nonexempt employees is going electronic. Effective Oct. 1, 2003, pay stubs for those employees will be available only through the Employee Self-Service function of SAP. Because of the change, exempt and nonexempt employees will be required to receive their pay through direct deposit, as opposed to a paper check.

"For those employees who have been receiving a paper check, direct deposit ensures that the funds are posted to their accounts quicker, without requiring a trip to their financial institution," says Accounting's Joel Lay. "Currently, 98 percent of ORNL's exempt and nonexempt employees use direct deposit. The electronic capability also allows Payroll to complete the pay distribution process for monthly and weekly employees even during a situation when site access might be restricted, such as a security incident or natural disaster."

The system is secure. Payroll information is not stored on the Web but rather is extracted from SAP for display only, explains Joel. An employee must enter his or her UCAMS user name and password to run the ESS transaction. When the em-

ployee runs the transaction, the information is encrypted and transmitted to the Web display through a secure connection.

Because employees can pull their stub straight from SAP, previous periods (at least for the last four years) can be accessed as easily as the current period, alleviating the need to request copies of previous periods by phone or mail.

"In addition to providing staff with easy and convenient access to payroll information, the shift to direct deposit and electronic pay stubs reduces overhead costs by approximately \$50,000 per year. The savings come primarily from reduced paper needs for printing checks and pay stubs, postage, and bank fees," says Payroll Accounting's DeAnn Ingram. The change to electronic pay was approved by the Leadership Team.

"This initiative helps the Laboratory reduce its indirect cost and allows more funds for scientific research and development—a goal of ORNL's Laboratory Agenda."

To be ready for the transition on October 1, exempt and nonexempt employees must take the following steps between now and then:

- Sign up for direct deposit of payroll if you currently receive a paper check. See Form ORNL-317 for instructions and required information. A separate notice has been sent to employees not currently on direct deposit.
- Make sure you have a user ID for computer access and an SAP account. Contact your division UCAMS coordinator if you have questions about this. Accounts have been requested for those employees who did not have them.
- The ESS application will only work on a PC with the Internet Explorer (IE) version 6.0 or higher or on a MAC with IE version 5.2. Make sure that your computer has browser capability to match these requirements.
- Try accessing your pay stub via the ESS application. It is already functional and includes tutorials and help screens, and assistance contact information.
- If necessary, attend a short training session on ESS navigation. Sessions will be scheduled in September and October.

# ORNL explores ways to manage rising health care costs

If you've been paying attention to headlines and soundbites, you're probably aware that health care costs are rising dramatically. Health care costs across the nation are up by an average of 13 percent. Prescription drugs account for the largest portion of that, increasing at a rate of 18 percent, with no apparent offsets in medical or surgical costs. Increases in health provider expenses weigh in second, along with an across the board rise in inflation. The other significant factor is an increase in consumer demand—the result of aging baby boomers coupled with an increase in advertising, particularly by the drug companies. Advances in medical treatment and technology raise both demand and provider expenses. Add in increases for ever-present government mandates and regulations,

*Health care is the largest personnel-related expense at the Lab.*

along with litigation, fraud and abuse and it's easy to see why health care costs are out of control.

The challenges facing ORNL are many. Providing health care for employees and their families, and also retirees, is by far the largest personnel-related expense at the Lab. Our projected health care cost for 2003 is around \$45 million. For 2004 costs are expected to rise by 15 percent. At the current rate of health care cost inflation, our costs will more than double by 2010, exceeding \$100 million.

If that doesn't grab your attention try this: A whopping 60 percent of our medical care costs are incurred by only 8 percent of all ORNL health care claimants. Then there are prescription drug costs. Nationally, 17¢ out of every health care dollar is spent on drugs. At ORNL, that jumps to 41¢.

Clearly these statistics provide a starting place for identifying ways to better manage our health care costs. ORNL Benefits has been

looking at a number of ways to minimize the impact of these distressing but unavoidable cost increases, both to employees and to UT-Battelle. The challenge is how to balance strategies for addressing rising health care costs with our unique demographics, population health status, culture, and company objectives.

The focus is on encouraging consumerism among employees and integrating health and disease management into a comprehensive health care strategy that promotes wellness and informed decision making. Our current system of premiums and co-payments tends to separate employees from the true costs of health care decisions. To effect any long-term changes in the cost of health care, employees need to understand their role as consumers of health services and the consequences of their purchase and utilization decisions.

By offering financial incentives, employees are encouraged to think harder about what they're spending their money on and, in the process, to become more educated, involved and engaged when making decision about health care services and providers. One example is the success of the CIGNA/MedcoHealth mail-order drug program in which co-pays are much lower than the retail pharmacy rates. The result is increased participation in the program, generating savings for both employees and UT-Battelle.

At ORNL employee turnover is very low—the continuity creates a positive environment for implementing a disease management program. These programs focus on improving health and thus controlling the costs of common, manageable diseases such as diabetes, asthma, congestive heart failure, coronary artery disease and hypertension. Cost savings occur over time as health improves and are both direct (lower health care costs), and indirect (increased productivity and reduced absence). Disease

management programs target those diseases in which preventive care *does* save money and where the patient may need support in managing a treatment regimen. Properly designed, such a program relies on prevention of complications, as well as treatment of chronic conditions. ORNL is evaluating several program options with a view to implementing disease management for 2004.

Workplace wellness programs are another facet of a comprehensive health management strategy. The leading causes of illness and disability relate to factors that individuals can control. Disease prevention and health promotion can postpone the majority of premature deaths. In the spring of 2003 ORNL Benefits reconvened the Lab-wide wellness committee to review wellness opportunities currently in place and recommend strategies for further development. Plans are to build a wellness program that will incorporate nutrition, exercise, risk assessment and intervention to improve employee health.

A successful total health management program produces benefits for everyone. Employees and UT-B realize cost savings from reduced health care costs. Employees experience enhanced wellness and an improved quality of life that allows for healthier, longer and more fulfilling lives.

This fall you will be hearing more about the ORNL health care strategy. You will be kept informed as decisions are made and finalized for implementation. Another Benefits Fair is planned for November 5, along with other forums for communicating news and information about health care benefits at ORNL.—*Kathryn Cogar*

## Lab wins regional FLCs

ORNL technologies have been named to receive several Southeast Region Federal Laboratory Consortium Awards. The Project of the Year award will go to "Robust Wireless Technologies for Extreme-Environment Communications" and the team of Stephen F. Smith, Gregory R. Hanson, Michael R. Moore, John P. Jones Jr., Roberto Lenarduzzi, Michael S. Emery, Gary W. Turner, Milton N. Ericson, Timothy E. McKnight, James O. Hylton, James A. Moore, Alan L. Wintenberg, William B. Dress and Paul D. Ewing.

Excellence in Technology Transfer awards go to "Thin-Film Rechargeable Lithium Batteries," Nancy J. Dudney, John B. Bates, Bernd J. Neudecker, Ashok Choudhury, Chris F. Luck and Greg R. Gruzalski and "Microcantilever-Based Biosensors," Thomas Thundat, Z. Hu and Russ Miller.

Honorable mention awards go to "Lab-On-A-Chip," J. Michael Ramsey, Stephen C. Jacobson, Roswitha S. Ramsey, Ashok Choudhury and Michael R. Knapp and "New Ion Exchange and Regeneration Technology for Water Treatment," Baohua Gu and Gilbert M. Brown.

## Summer

*Continued from page 1*

"Habitat hunters" is an activity children participate in each morning. Their teachers take them to one of five places throughout the week where the object is to find as many kinds of habitats as they can. On the last day of camp, whichever group has found the most habitats at each place wins this good-natured competition.

"The purpose of habitat hunters is to try to get them to become a lot more observant and aware of what is going on around them," Kris says. "We see a big difference by the end of the week. They really are starting to pick up on things."

Freels Bend is not the only place campers learn and are exposed to fascinating science, however. Touring ORNL facilities, which is new to the camp agenda this year, augments

their experiences nicely, Kris says. Each Friday the children visit ORNL's historic Graphite Reactor, the Environmental Sciences Division's aquatic ecology laboratory, and robotics research in the Nuclear Science and Technology Division.

"They've been having a ball. They love the robots, and aquatics go right along with our stream ecology lessons," Kris says. "And the reactor is an important part of Oak Ridge history."

These tours and the different subjects studied during ORNL Science Explorers Camp make it a lot of science and a little bit of everything from history to tag games. This is a good combination.

"It helps them to appreciate nature," Kris says.—*Erin DeMuth*

## Grid

Continued from page 1

move electricity more efficiently with lower transmission losses than conventional aluminum or copper wires)—ORNL's superconductivity program, led by Bob Hawsey, has had partnerships with several wire and cable manufacturers for more than a decade. First-generation, high-temperature superconducting (HTS) wires are now commercially available in kilometer lengths, and second-generation wires with an even higher performance-cost ratio are being developed by several ORNL licensees as well as others in the United States, Europe and Asia. With one partner, Southwire in Carrollton, Ga., a test of a 30-meter-long, three-phase superconducting cable has logged more than 22,000 hours without any degradation or lost efficiency. Again partnering with Southwire, ORNL is co-designing a 300-meter superconducting cable that will carry 3,000 amps that is scheduled to be installed in a Columbus, Ohio, substation in 2005. According to Hawsey, a next-generation cable prototype using an ORNL-invented triaxial cable termination design is under development with expected availability in 2006. Also, ORNL is working with Waukesha (Wisc.) Electric Systems to develop an oil-free superconducting power transformer that can change voltage carried through cables, has twice the overload capability, will reduce the cost for associated switchgears and breakers and can interface directly with underground superconducting cable. The transformer is expected to be marketed in the latter half of this decade.

**Grid Modeling** (Grid modeling is the study of network management using computer simulation)—A dynamic computer model developed by Ben Carreras of Fusion Energy Division and university partners simulates an electrical network. By incorporating the slow growth of the power demand and the engineering responses to failures, researchers found that the network tends to operate close to the breaking point where small events, such as a blown breaker, can cascade into larger outages. The model predicts the probability that the network will experience a catastrophic blackout. Carreras says, "We are using our model to predict the need for generator reserve on a network. The information we get could suggest a need for changes in operating policy when the electrical system approaches its limits."

Kirby says that transmission must be made more robust and reliable and that ORNL's role is primarily long term. Two studies he mentions specifically are black starts and grid reliability. ("Black start" is a term used for restarting a power plant during a power outage. A plant needs power from some source for restart. Hydropower is frequently the source.)

New initiatives for power transmission include one test facility opened earlier this year and three more in the planning stages. The Powerline Conductor Accelerated Testing facility is a new outdoor test facility that came on line earlier this year for conducting thermal stress and age characterization of advanced power line conductors.

Three other facilities, planned for 2004, are the Indoor Powerline Conductor Accelerated Testing Facility, the Powerline Conductor Operational Testing Facility and the Power Electronics Field Test Facility. The Indoor Powerline Conductor Accelerated Testing Facility is planned to be completely under the roof of the K-33 building at the East Tennessee Technology Park and will be designed for conducting thermal stress and characterization of advanced power line conductors and superconducting cables. It also will have the ability to test multiple conductors in parallel tests.

As the grid recovers from the 2003 blackout, ORNL researchers will be active in proposing measures that can lead to a robust 21st century national transmission system to promote the economy and energy security. They will be working with program managers in DOE's new Office of Electric Transmission and Distribution and laboratory partners to accelerate development and introduction of new technologies into the grid.

An issue of the *ORNL Review*, Volume 25, No. 2, 2002, was devoted to Energy Security and outlined dozens of ORNL research projects. The issue is on the web at: [www.ornl.gov/ORNLReview/vol35\\_2\\_02/cover\\_story.shtml](http://www.ornl.gov/ORNLReview/vol35_2_02/cover_story.shtml)

The OETD web site, created by ORNL staff members, may be viewed at: [electricity.doe.gov](http://electricity.doe.gov).—*Marty Goolsby*

## Service Anniversaries

September

**40 years:** Ray F. Holdaway, Nuclear Science & Technology; Anthony C. Schaffhauser, Energy & Engineering Sciences Dir.

**35 years:** Shannon E. Bridges, Contracts; Philip W. King III, Communications & Community Outreach Dir.; Jerry C. McLaughlin, Metals & Ceramics

**30 years:** E. W. Castleberry, Integrated Operations Support; Sigurd W. Christensen, Environmental Sciences

**25 years:** Joan E. Carrington, Sharon D. Fritz, Gerald R. Hadder and John F. Thomas, Engineering Science and Technology; Janie Gardner, Metals & Ceramics; Marvin J. Liles, Contracts; Marshall T. McFee and Graydon L. Yoder, Jr., Nuclear Science & Technology; Michael G. Ryon and J. W. Webb, Environmental Sciences; James R. Thompson, Condensed Matter Sciences; Glenn R. Young, Physics

**20 years:** Mattison K. Ferber, Metals & Ceramics; John K. Gibson, Chemical Sciences; Peter J. Hildebrandt, Craft Resources; Michael R. Hilliard and L. C. Maxey, Engineering Science & Technology; Tom A. Keeble, Integrated Operations Support; Surinder P. Singh, Nuclear Science & Technology; Judy L. Trimble, HR & Diversity Programs Dir.; Richard C. Ward, Computational Sciences & Engineering

## Shedding new light on solar energy

ORNL will host the First Annual Hybrid Solar Lighting Summit in Knoxville, Tennessee, on October 7–8, 2003, at the National Transportation Research Center. Hybrid solar lighting is an innovative solar technology that uses sunlight in its natural form to reduce the need for electric lighting, the largest consumer of electricity in commercial buildings.

For more information on hybrid lighting or the conference go to [www.ornl.gov/hybridlighting](http://www.ornl.gov/hybridlighting).

The Summit is intended for a broad audience of participants including energy and environmental policy makers, solar and clean energy advocates, lighting designers, architects, utilities, green power providers, and prospective commercialization partners.



Jeff Muhs with a hybrid lighting system solar collector at the National Transportation Research Center.

Curtis Boles

# Cultures, crowd mark UW's first International Festival

There was something for everyone (except, at times, plenty of space) at ORNL's first International Festival, held August 26 in the "Main Street" area of the new Research Office Building. The fundraiser for United Way drew more than 600 staff members to the two-hour event. Nine global cultures were well represented as employees donned national costumes, cooked numerous cultural dishes and displayed posters and artifacts from their countries of cultural heritage.



**Andrew Pazant** played the pipes for the International Festival.

Special entertainment included martial arts by David Broughton, Business and Information Services; guitar and vocals by Bill Cabage, Communications and Community Outreach; Scottish country dancing by Sandy Parrish, Health Services, Randy Parrish, Craft Resources, and guests Gail Taylor and Cynthia Atkins; bagpipes (including "Rocky Top") by Andrew Payzant of the M&C Division; African drumming and vocals by Bill Capshaw and Francis Harshaw, both employed at ETTP; vocals and keyboard by Sharon Rucker of Facilities Management; and

violinist Michael Hu of the Nuclear Science and Technology Division.

Each cultural exhibit included foods native to its culture, with more than 67 dishes available for sampling. The Appalachian/Southern exhibit also included demonstrations of spinning, woodcarving and dulcimer music.

Laboratory Director Jeff Wadsworth and

Deputy Director for Science and Technology Lee Riedinger assisted Teresa Ferguson, mistress of ceremonies for the festival, in the distribution of door prizes.

The event raised more than \$3,400 for United Way. Encouraged by the many positive comments, the International Festival Committee is planning for a bigger event next year.—*Marty Goolsby*

## ORNL people

**Betty F. Maskewitz**, who co-founded and directed the Radiation Safety Information and Computation Center, has earned the American Nuclear Society's 2003 Weinberg Medal. The award was established in 1995 to honor ORNL Director *Emeritus* Alvin M. Weinberg and to provide international recognition for contributions to the understanding of the social implications of nuclear technology. Employed at Oak Ridge from 1952 until her retirement in 1988, Betty is an internationally recognized specialist in the fields of information sciences and engineering physics.

**Becky Verastegui**, director of the Networking and Computing Technologies Division and chief information officer at ORNL, has been appointed to the Tennessee Information Systems Council by Gov. Phil Bredesen. The council is responsible for overseeing Tennessee procedures for telecommunications, computer or computer-related equipment and services within state government and evaluating how

those systems are managed.

The Welding Institute of the United Kingdom has presented an award to **Sudarsanam Suresh Babu** of the Metals and Ceramics Division for his contributions to welding technology.

**Paul F. Becher**, a corporate fellow and research group leader in M&C Division, has been named to the National Materials Advisory Board of the National Research Council of the National Academies.

M&C Division's **Chun Hway-Hsueh** has been named associate editor of *The Journal of the American Ceramic Society*. He is an associate editor of the publication *Composites Part B: Engineering*.

Former Environmental Sciences Division researcher **Art Stewart**, currently an adjunct professor at the University of Tennessee, is author of a new book of science-based poetry, *Rough Ascension and Other Poems of Science*. The book, published by Celtic Cat Publishing of Knoxville, will be available this month.

**ornl** reporter

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