

## Catching up

### ORNL key in Office of Science initiative to regain lost U.S. lead in scientific computing

ORNL, where the United States is regaining its lead in neutron science, may also be the place where the U.S. takes back its first place in scientific computing.

Dr. Ray Orbach, in his first visit to ORNL as Office of Science director, announced

areas that matter and find out what kinds of problems they need to solve in scientific computing to create new concepts in science. We want to bring them together with computer scientists, the people who make the chips and the applied mathematicians—the

galaxy of individuals necessary to actually create a design for them. That's happening here at Oak Ridge," Dr. Orbach said.

The new initiative comes in the face of the success of Japan's new supercomputer, the Earth Simulator, which represents a leap ahead of supercomputers available to scientists in the United States. The Cray project is the first U.S. step toward catching up.

DOE's science director, who came to ORNL for its

annual on-site review, also ceremonially initiated the hookup of a new high-speed data link to Atlanta, which will in turn provide instantaneous data transfer between the Lab and a host of research institutions regionally and, ultimately, nationally (sidebar, page 5).

Dr. Orbach's focus on scientific computing comes with a sense of urgency. The United States, he said, has lost its edge in scientific

computing.

"Japan's Earth Simulator, which came on line in April, means that the U.S. has lost its lead, particularly in climate science research," he said. The OSC director terms the situation "potentially grave."

He explained that Japan's Earth Simulator represents more than simply having a bigger, better computer. The best scientists will go where the best resources are, and that is where important discoveries will be made.

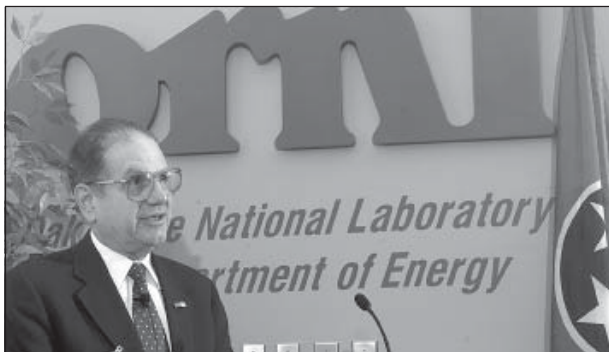
Scientific simulation, he said, has progressed to the degree that it now represents a "third leg of the stool" in the process of scientific discovery along with theory and experimentation.

"People think of computers as machines that solve equations," he said. "Computers have advanced to such a state that, in the 21st century, we are seeing scientific discoveries being made. Simulation has reached the importance of theory and experiments in the laboratory.

"The U.S. has lost the lead in climate science research. Other areas of science critical to the Department of Energy's mission are at risk. The Earth Simulator will give the Japanese a factor of 20 to 50 times the effective speed of anything the United States has. That turns out to be a catastrophe."

"Scientific discovery is the health of our

(See ORBACH, page 4)



Office of Science Director Dr. Ray Orbach made the case for a major supercomputing initiative during his August visit to ORNL.

August 15 that ORNL will serve as the testbed for a new supercomputer architecture intended specifically for scientific applications. ORNL will acquire a 32-processor Cray X1 supercomputer system and work with Cray to evaluate the system's design and software for its suitability for scientific problems.

"We want to talk to the scientists in the

## World has changed; National Security's mission is the same

Our series of articles by Leadership Team members continues with Associate Laboratory Director for National Security Frank Akers.

BY FRANK AKERS

What a difference a year can make. Not only in the lives of individuals, but in organizations as well.

Since its inception in 2000, the mission of the National Security Directorate has been to provide programmatic and organizational focus for Lab activities supporting the National Nuclear Security Administration, the Departments of Energy and Defense and other national security-related agencies, departments and organizations.

However, Sept. 11,

2001, changed the country dramatically and put the United States at war with terrorism and terrorists. So for the NSD as a whole, the mission hasn't changed—the world has.

While the United States is now at war, it's not the kind of war Americans are used to fighting. There are no front lines, no uniforms and no centers of manufacturing to attack.

Instead, it's a fight against unknowns, shadows and puzzles. One of the tools that the U.S. can use in this struggle is technology. That's what the National Security staff are now working toward—finding the technologies that NNSA, DOE, DOD and other government agencies can use, not only to protect the United States and prosecute the war against terrorism, but also to prevent the next terrorist strike before it happens.

The initial funding after 9/11 went to security at airports, security for special events and acquisition of materials for emergency response. That's been done. Now the hard part begins—what do government agencies need and how long will it take to get it?

Secretary Abraham has said that as a result of 9/11, homeland security is DOE's first

*It's not the kind of war Americans are used to fighting.*

priority and that technology is key to this effort. Homeland security has become the defining term for the concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism and minimize the damage and recover from attacks that do occur. This homeland security focus puts a lot of responsi-

(See AKERS, page 5)



Frank Akers

# JICS/ORCAS: State's 'compelling' partnership with ORNL

Under the tent, before speaking, University of Tennessee President John Shumaker called for a moment of silence. Workers on the privately funded facilities site, just yards away, rattled along with their tasks.

"There is nothing like the sound of construction to make a university president's heart beat with joy," he said.

Shumaker joined a number of dignitaries—including Gov. Don Sundquist, Lt. Gov. John Wilder and Rep. Zach Wamp—in helping ORNL dedicate its Joint Institute for Computer Sciences. The facility, supported by \$9 million

in state dollars, will also house the Oak Ridge Center for Advanced Studies.

JICS/ORCAS is the state-funded part of a pace-setting triad of federal, state and private investment in ORNL's future.

ORNL officials realized going in that federal

dollars alone would never be available in the sums the Lab's modernization program would require. The state, on the other hand, until recently had never played a large role with the federal facility. The two have come together under the realizations that a research laboratory of ORNL's stature has tremendous potential as an economic driver for the state and that state support can help the Lab provide facilities for

its resident and guest researchers.

"The idea of a state investment of (in all) \$26 million on four facilities at ORNL was unprecedented, but compelling," Gov. Sundquist said at the August 22 dedication. "We agreed that the investment would have multiple returns in neutron, computational and biological science. That just begins the process. Tennessee ought to be on the cutting edge of everything. The University of Tennessee and the Lab have helped develop new companies, and that's what it's all about."

JICS will be part of ORNL's efforts to expand the Lab's high-performance computing capacity on a path to a 100-teraflop computer, which would be the world's largest. Office of Science Director Ray Orbach, just the week before, announced a DOE supercomputing initiative that could result in up to a half-billion-dollar investment at ORNL alone (see page 1).

Scheduled for completion in early 2004, the joint institute is owned by the state on land deeded from DOE, an innovative approach that will enable faculty members from UT to work side-by-side with ORNL staff.

Besides JICS/ORCAS, the state is also investing in joint institutes for neutron and biological sciences. The state also provided—by unanimous vote—crucial tax relief for the Spallation Neutron Source. All of this during a time when state officials have been dealing with an uncertain financial outlook.

The state officials "faced unbelievable financial and political challenges," Lab Director Bill Madia said at the dedication

ceremony. "True to his character, each honored his commitment."

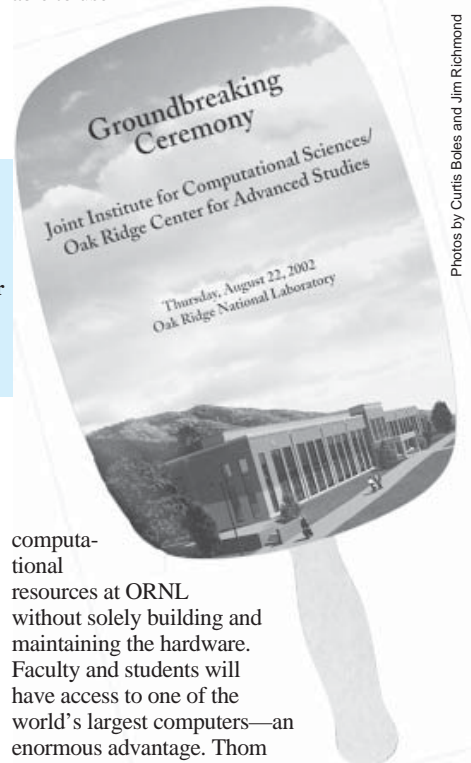
Bill also commended DOE for the unprecedented steps the agency took in arranging for the private and state investments. "They took risks and got out of their comfort zones," Bill said. "Federal risk-taking is an oxymoron. These folks did it."

ORNL's partner—UT—stands to benefit handsomely from JICS. The university will be able to use



Gov. Don Sundquist poses beside a conceptual drawing that includes one of the state's "best investments."

**The August 22 JICS/ORCAS dedication occurred outdoors on one of the summer's muggiest days. Old-fashioned paper fans were all the rage—a perfect marriage of high tech and low tech.**



Photos by Curtis Boles and Jim Richmond

computational resources at ORNL without solely building and maintaining the hardware. Faculty and students will have access to one of the world's largest computers—an enormous advantage. Thom Dunning, a professor at the University of North Carolina, has been selected to direct the joint institute.

For ORNL, the students and researchers who will use JICS represent a significant pool of talent. Additionally, the partnership with UT could bring other funding resources currently not available to the Lab.

The 52,000-square-foot facility will also house ORCAS, set up as a "think tank" partnership among ORNL, its collaborating universities and other national and international experts. ORCAS will actually meet this fall in Washington, before its new home is completed, to address energy infrastructure assurance.

Gov. Sundquist called the state's backing of JICS/ORCAS a "wise investment" and praised those behind the scenes for persevering when some said it couldn't be done.

"I hope this is the first of many right decisions where we've stuck our necks out—invested in the future—for better jobs and higher education," he said. "We did one thing well—this project."—B.C. **ornl**



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.

Bill Cabage, editor  
Phone 865/574-4399  
E-mail cabagewh@ornl.gov

Deborah Barnes, associate editor  
Phone 865/576-0470  
E-mail barnesds@ornl.gov  
On the Web: www.ornl.gov/reporter

DOE Inspector General Hotline: 1-800-541-1625



Curtis Boles

Jodi Lockaby, a graduate student in the University of Tennessee's science writing program, spent a brief but productive summer internship at ORNL. She interviewed several Lab researchers for *Reporter*, plus she got a birds-eye view of the new facilities construction.

# Lab Notes

## ORNL's the real thing

Ashley Sanns, of Pittsburgh, Pa., received her belated birthday present last month. Ashley turned sweet sixteen last September, and while some young ladies might request a Miata for that milestone, Ashley said she wanted to visit ORNL.

Ashley is interested in a career in high-energy and particle physics (her father, Frank, is a physicist). Through Web searches, ORNL kept popping up as a destination within reach. Initial inquiries about a tour of the Lab were made last summer and the visit was arranged for late September.

Then the events of September 11 derailed those arrangements. Her interest in science and ORNL endured.

Ashley and her family (dad Frank, mom Rebecca and brother Sean) finally made the trip to ORNL on August 1, visiting the Holifield Radioactive Ion Beam Facility, the High Flux Isotope Reactor and the High Temperature Materials Laboratory. The Sanns' also received a dose of history through a tour of the Graphite Reactor Museum.

The experience confirmed her aspirations for now. "I feel like it's possible for me to succeed in physics," she said over a cafeteria meal.

## Element 61 revisited

Jim Marshall is homing in on his ambition: to visit all of the sites where the elements of the periodic table were discovered. It's a quest that has taken him from the world's greatest cities such as Copenhagen and St. Petersburg to abandoned mines in Transylvania and Germany. In August his quest brought him to ORNL.

The existence of element 61—promethium—was confirmed at ORNL through experiments at ORNL's Graphite Reactor. Although others had claimed to discover it

before, it wasn't confirmed until experiments by J. A. Marinsky, L.E. Glendenin and C.D. Coryell shortly after World War II. Pm does not exist in nature.

Marshall, who says he is about 95 percent complete, saved ORNL for a later visit because it's one of his easiest destinations. He found it remarkable that the Graphite Reactor still exists and is so easy to visit. Other sites, such as the abandoned mines, haven't been so accessible.

Marshall says his goal was made feasible by the Internet, which sped communications; the global positioning sensor, which simplified finding sites; and the demise of the Iron Curtain, which gave access to several sites.

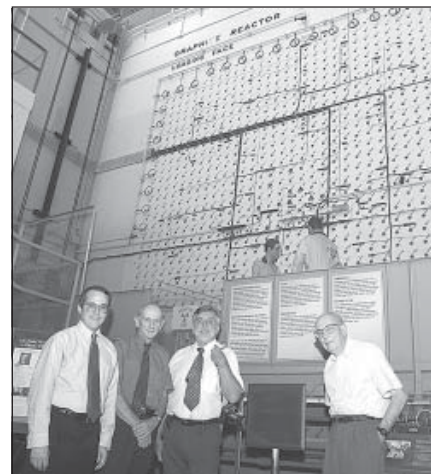
The University of North Texas professor intends to publish his travels in both book and CD form, in three or four years. When it was suggested his project would also make a great film, he agreed. Then it was pointed out that to make a film he'd have to visit all of those places again. Marshall got a faraway look in his eyes.

"That would be wonderful."

## Van de Graaff headed south

Although ORNL's tandem Van De Graaff accelerator is being disassembled in its long-time home in Building 5500, parts of it could likely see service again elsewhere. The physics division's Alfredo Galindo-Uribarri is working with colleagues in Mexico to send some of its components to a research lab near Mexico City.

Alfredo worked for a year at the *Instituto Nacional de Investigaciones Nucleares*, and realized his former colleagues could make use of components from ORNL's Van de Graaff,



Curtis Boles

at the scene of promethium's discovery are (from left) ORNL's Jim Roberto and Dick Haire, visitor Jim Marshall and retired Lab scientist Ellison Taylor, who remarked that in the old days the only air-conditioned facilities at ORNL were in the counting rooms, for the sake of the instruments.

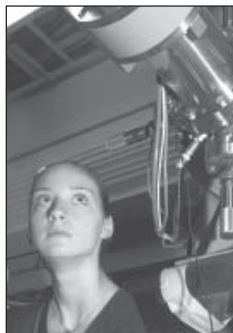
which began service at the Lab in the early '60s.

"There is an identical accelerator there, and the idea is that ORNL's parts could be useful to keep it running," Alfredo says. "These include dipole magnets, quadrupoles and parts of the accelerator's beam line. Some of the most important components are the high voltage accelerator tubes inside the machine."

Alfredo points out that as the Lab gives, it also receives. One of ORNL's top machines for astrophysics research, the Daresbury Recoil Separator, came practically free of charge from the Daresbury lab in England. And, of course, the Spallation Neutron Source project's giant crane, Big Bertha, came to Tennessee courtesy of Lawrence Livermore.

Reported by Bill Cabage

Jim Richmond



Ashley Sanns gets up close to physics.

## Summer term sparks invention

Mark Bennett and Carl Eng created sparks in the lab at the National Transportation Research Center, and they measured just how much damage was being done to the spark plug each time. The two students participated in the DOE-sponsored Community College Institute summer program at the NTRC.



Bennett (left) and Eng at the bench.

Mark, who attends Jefferson Community College in Louisville, Ky., and Carl, a student at Suffolk County Community College in Long Island, N.Y., worked together for 10 weeks helping to design a tool that will more efficiently test spark plugs for automotive engines. They are studying the spark plugs to see what kind of device design would minimize erosion during quality testing.

Researcher John Whealton, their mentor for the summer, raves about them. "They are creative, energetic and diligent. And they have gotten a lot done. They were able to make a single-shot spark-plug erosion measurement technique for high pressures. That has never been done before," he says.

Mark remarks that problem solving was a challenge they particularly enjoyed. "John would give us a direction and we would figure out how to get the information he needed. Carl and I played on each other's strengths and learned from each other," he says. See more about ORNL's summer students on page 6.—Reported by Serena G. Harper

# Orbach

Continued from page 1

economy. Half the gross domestic product growth since World War II is related to scientific discovery. This is what we lose when we take away that third leg of the stool."

He noted that DOE has the responsibility for scientific leadership—to attract the best people to make discoveries that may be as important as the nation's future energy security.

Japan's success with its supercomputer doesn't reflect any basic inferiority in U.S. scientific computing. The difference is that they built the Earth Simulator strictly for solving scientific problems. The U.S. approach until now, said Dr. Orbach, is a "one size fits all approach" that is essentially to take commercial, commodity-product computers and adapt them to scientific problems.

The Center for Computational Sciences' Buddy Bland explains further that the Earth Simulator's design includes features that help take advantage of the benefits of "Moore's Law," a popular—and since the 1970s, accurate—axiom that processor speeds will double every 18 months.

"But we've not been paying attention to everything around the processors," Buddy says. "The problem is what *hasn't* been doubling every 18 months, which is the ability to get information in and out of the

processors. The Japanese have had a more balanced approach."

Buddy supplies an analogy: "Buy a car with a 150-horsepower engine. You want a racecar, so you just drop a 700-hp engine into that standard car. But you don't have the right tires, transmission or suspension. You won't get the performance you really want unless you balance the whole car's design."

Similarly, the best U.S. supercomputers now run at about 12 teraflops at 10 percent, at best, efficiency. The Earth Simulator runs at 40 teraflops at 50 percent efficiency. Moreover, the Earth Simulator is not networked. Work on the supercomputer will have to be done, and resulting discoveries made, in its hometown, Yokohama, in the presence of graduate and postdoctoral students—the future of the field.

"It will take us four to five years to catch up. I can't overemphasize the severity of the situation," Dr. Orbach said.

In remarks later, Dr. Orbach noted ORNL's emerging leadership in neutron sciences in addition to its role in the new computational science initiative. He told the East Tennessee Economic Council, "By 2006, ORNL will be recognized as the finest lab in the world for doing science."

In the meantime, Japan, which worked for four years to build the Earth Simulator, will be upgrading its supercomputer.

Dr. Orbach's vision, supported by a

*Unless the United States regains its leadership in scientific computing, important discoveries will be accomplished by scientists on other shores.*

committee of scientists he convened to analyze the initiative, is a program similar in size to the Spallation Neutron Source—roughly \$1 billion over four or five years.

The Cray supercomputer bound for ORNL is one of the first steps in the initiative toward an optimized supercomputer for science. The Lab's Center for Computational Sciences and Cray will evaluate the processors, memory and scalability of the design and software environment of the system to determine its suitability for the solution of complex scientific problems. The Cray X1 system, currently in development, will be the first U.S. computer to offer vector processing and massively parallel processing capabilities in a single architecture. The Earth Simulator employs a similar advanced vector processing design.


Japan built its computer for climate-change modeling. Climate-change research eventually goes far beyond basic science. Industries, for instance, will rely on discoveries abetted by high-end scientific simulation to decide how to adapt and react to climate change. The United States, with an energy appetite that is expected to double over the next century—combined with a growing world demand—must forge ahead with energy-efficient technologies and, more importantly, find new sources of clean energy. Fusion represents a simple but as yet unattained goal of harnessing the clean energy of the sun.

"The President's Energy Policy calls for us to investigate fusion energy. It will require scientific simulation. A burning plasma machine will cost \$6 billion, but no one will want to spend that unless we know that it's going to work. You need scientific simulation." Dr. Orbach said.

He again emphasized that unless the United States regains its leadership in scientific computing, that work will be accomplished by scientists on other shores.

The Office of Science plan, in another similarity to the multilab SNS, involves five DOE labs—ORNL, Argonne, Berkeley, Brookhaven and Pacific Northwest. ORNL, along with being the site of the first steps, stands to be the leading player in the initiative.

ORNL's growing strength in scientific computing was cited as a reason for that role. Another advantage is its new quarters for scientific computing, now under construction in the privately funded complex. That facility will feature a 40,000-square-foot computer room—a perfect home for the Next Big Thing. ORNL Director Bill Madia believes the Lab is up to the task.

"Dr. Orbach has laid down the challenge very well," Bill said after the OSC director's announcement. "We're gonna do it."—B.C. 

## Fast as the *Wind*: ORNL's high-speed link

Organizers called it "First Light"—in an August 14 ceremony attended by a host of officials from DOE, universities and industry, Office of Science Director Ray Orbach and Lab Director Bill Madia applied the symbolic patch that established a high-speed data link between ORNL and Georgia Tech in Atlanta.

The connection links the Lab's supercomputers to, first, Georgia Tech and eventually many premier schools around the country. The link will connect DOE's ESnet computer network with Internet2, the network of top-tier universities, at speeds up to 20 times faster than the previous ORNL connection.

Just how fast is it? It's 200,000 times faster than the fastest home dial-up connection.

With the new link, a data file the size of the movie *Gone With the Wind* could be transmitted in six seconds. (The latest Austin Powers movie would take two seconds.) Qwest maintains the infrastructure.

"This new connection gives us an opportunity to interact with our most important scientific tools," Dr. Orbach said. "Petaflops and teraflops are more than just words. We will need them to operate in this new environment."

The Office of Science director predicted that high-speed data links will spur collaboration among labs and schools and will allow more users to remotely operate big DOE facilities such as the Spallation Neutron Source. "There has to be a pipe big enough to get the data there and back," he said.—B.C., with Ron Walli

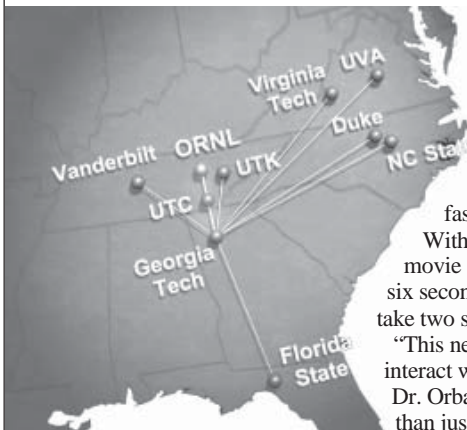


Image by John Jordan

# Akers

Continued from page 1

bility on the shoulders of national laboratories to deliver technologies and systems into the hands of organizations that need them.

Perhaps Gov. Tom Ridge, the director of Homeland Security, put it best when he said that the hardest problem he has is determining which technologies are “best in class” for solving a particular requirement. The organizations and individuals who ultimately decide which technologies are best in class, however, may not be aware of what ORNL has to offer. That’s why the NSD staff spend a lot of time on the road showcasing the Lab’s capabilities to governmental agencies and departments so they know where they can get their difficult technology challenges solved.

As DOE’s largest multipurpose laboratory, ORNL is ideally suited to develop the technologies that will be used to protect the country, as well as prosecute the war against terrorism. The variety and cutting-edge nature of the research taking place here, coupled with the impressive new facilities being built, hold the promise of providing national security

*Those who ultimately decide which technologies are best in class may not be aware of what ORNL has to offer. That’s why the NSD staff spend a lot of time on the road.*

customers in the U.S. government with the tools they need to fight this new enemy.

By working closely with the research directorates, the NSD staff have already found that many of the technologies ORNL has been developing are applicable to homeland security. They include sensors for explosive, chemical, biological, radiological and nuclear threats; modeling and simulation for threat analysis and emergency response; and tools for information synthesis and analysis.

To expedite the time it usually takes to get governmental organizations to act on new technology, the NSD has been successful in getting many high-ranking officials to visit ORNL this year to see the technologies and talk to the scientists and engineers who created them. These visitors include, but aren’t limited to, the secretary of the Army, the surgeon general of the U.S. Army, the deputy commanding general of the Army Materiel Command, the commanding general of the Criminal Investigation Command, the Battelle Memorial Institute’s Senior Advisory Group, the chief of Naval Operations Strategic Studies Group and the U.S. attorney for the Eastern District of Tennessee.

We find that once we get VIPs down here and show them what we have to offer, they generally walk away very impressed with the people and the facilities. That, in turn, opens other doors.

The Lab has also designated Mike Kuliasha Oak Ridge National Laboratory

to be its director for Homeland Security. He’s been assigned to the NSD to direct the Laboratory’s efforts in matching ORNL technologies and capabilities with the needs of governmental organizations and departments. He’s also been given the responsibility for developing the NSD’s Laboratory-Directed R&D call. For the first time in its short history, the NSD has been given funding to develop promising new technologies that can ultimately be used in national security applications.

Of course, the best hope in protecting the nation is to prevent the next attack from ever happening. This is especially true when it comes to weapons of mass destruction. The NSD works very closely with Y-12 as part of the Oak Ridge Center for International Threat Reduction in ensuring that destructive materials from the former Soviet Union remain under close supervision and out of the hands of those who would use them directly against the United States or its allies.

We believe that the ORNL staff assigned to the ORCITR are really unsung heroes in the fight against terrorists and terrorism. They

don’t get enough credit for what they do, but they’re absolutely essential in protecting the U.S. from these horrible weapons.

To handle the increased workload

that was generated by 9/11 and the threats that are still possible, the NSD increased its numbers. Most of our staff are located at ORNL, but four work off site. At this point in its development, the NSD has, by design, no research, scientific or technical staff and no laboratory space. NSD staff members work with the research staff of the scientific directorates to develop the technology that can be applied to the national and homeland security needs of its customers.

The threat of weapons of mass destruction, airliners turned into missiles and anthrax in post offices all show that we are living in strange times. No one would have dreamed of any of those things a year ago. Then September 11 happened.

President Bush aptly captures our progress and success by reminding us that “we are a different nation today—sadder and stronger, less innocent and more courageous, more appreciative of life, and for many who serve our country, more willing to risk life in a great cause. For those who have lost family and friends, the pain will never go away—and neither will the responsibilities that day thrust upon all of us. America is leading the civilized world in a titanic struggle against terror. Freedom and fear are at war—and freedom is winning.” ORNL is at the forefront of this new war.

What a difference a year can make. [ornl](#)

# ORNL people

The Metals and Ceramics Division’s **Man H. Yoo** and **Chong Fu** have received the Minerals, Metals & Materials Society’s Champion H. Mathewson Award. The award, established in 1933, goes to authors of papers or series of closely related papers considered the most notable contribution to metallurgical science during the period under review. The award-winning paper is titled “Physical Constants, Deformation Twinning and Microcracking in Titanium Aluminides.”

The Engineering Science and Technology Division’s **Stacy C. Davis** was named winner in the health science and technology category at the Oak Ridge YWCA “Night of Tribute.” Also among the winners was Oak Ridge High School student **Susanna Hutton**, who was named “young woman of distinction.” Susanna worked at ORNL this summer, also in ESTD.

**Gail Lewis** and **Mary Kiser** of Audit and Management Advisory Services have earned the Certified Information Systems Auditor designation, the globally accepted standard of achievement in the information systems audit, control and security field.

The **Carbon Dioxide Information Analysis Center** recently received an appreciation award from Office of Science Director Ray Orbach, congratulating DOE’s “premier center for global change data and information” on its 20th year. The inscription says that CDIAC “set the standard for quality-assuring and documenting key global-change data bases, and provided this information to a diverse user community of researchers, educators, students, government and corporate officials, the media and the interested lay public.”

## SNS marks safe million

More than 1,000 Spallation Neutron Source staff, subcontractors, construction craft and workers and guests were treated to lunch on August 22. They were celebrating one million hours of construction without a lost workday incident.

The event was organized by the Knight/Jacobs Joint Venture, which is in charge of all construction on the site. ORNL as a whole had a similar million-hour safety celebration in early June.

That same morning, groundbreaking began on the Central Laboratory and Office Building, the last major building to be constructed for the project.

Rep. Zach Wamp and Lab Director Bill Madia stopped by to express their appreciation for the work being done by the 600 to 700 Knoxville Building Trades workers who fill the site on any given day. The huge construction project, located atop Chestnut Ridge, is slated for completion in early 2006.—Reported by **Charlie Horak** [ornl](#)

# Summer scientists

## RIA session gives 40 students hands-on experience in low-energy nuclear physics

More than 40 graduate and postdoctoral students now have hard-to-come-by, hands-on experience in their chosen field—low-energy nuclear physics—thanks to a special summer session held at ORNL’s Holifield Radioactive Ion Beam Facility.

The week-long summer session was the first of a series of programs aimed at educating



**Daniel Stracener from Physics Division works with RIA students at the Holifield Radioactive Ion Beam Facility.**

young researchers who one day may use the proposed Rare Isotope Accelerator, the next-generation nuclear physics accelerator. The first RIA Summer School on Exotic Beam Physics was jointly organized by accelerator laboratories at DOE’s Oak Ridge, Berkeley and Argonne national laboratories and at Michigan State University.

ORNL is home to the Holifield Radioactive Ion Beam Facility, Berkeley has the 88-Inch Cyclotron and Argonne has the Argonne Tandem Linac Accelerator System, or ATLAS. MSU hosts the National Superconducting Cyclotron Laboratory, a National

Science Foundation lab.

ORNL’s Holifield Facility is DOE’s only operating rare-isotope lab. It will provide much experience and expertise for the next-generation RIA. Witek Nazarewicz, the Holifield’s scientific director, was one of the RIA summer school’s directors who helped set up the local organizing committee and found support to bring the students from all over the country to ORNL.

“This is all about nuclear physics—the first school of its kind, and it was a tremendous success,” Witek says. “In addition to morning lectures, they received hands-on training and performed real experiments with our scientists with a real beam—a nickel-58 beam from the Holifield. It worked beautifully.”

The students were treated essentially the same as any Holifield users—badged, trained and set to work on experiments with ORNL scientists.

Witek submitted the proposal to have the RIA school jointly among the four national labs. “It was a beautiful collaboration between DOE and NSF labs,” he says. “All of us are interested in exotic beam physics. We volunteered to do the first one.”

The summer school will rotate each year among the four labs. The week-long, August 12–17, session received a Tennessee sendoff with a whitewater rafting trip down the Ocoee. Nevertheless, for many students the opportunity to do real research might have been the week’s ultimate thrill.

“This is the first time our participants got their hands dirty a little bit, and they loved it,” Witek says. “We are hoping some of those kids will come as users.”—B.C. [ornl](#)

## Students comment: “Part by part”

What the RIA students said about their session at the Holifield Radioactive Ion Beam Facility:

“Congratulations to the organizers. This was really an interesting summer school.”

“This RIA school was very successful. It will be very helpful in my future career. After all, rare isotopes physics is the future of nuclear physics.”

“I found (the school) very stimulating; good to meet other people working on nuclear physics; good to have an overview of what others are doing. Very well organized; invited lecturers were very good. Congratulations!”

“This was good for personal academic development. Good complement for what I’ve done to date—and also a good chance to meet profs from diverse backgrounds.”

“Unlike other places, we were able to see tools part by part.”

“I wish I had gone to a summer school like this when I started my Ph.D. I would have been much further ahead.”

“I would like to attend it next year again!”

“Thank you for RIA School I.”

# Minority internship program attracts outstanding students to ORNL

Eleven students from seven U.S. colleges and universities participated in summer internships at ORNL under the Research Alliance for Minorities, or RAM, program.

RAM’s goal is to increase the number of African American, Hispanic American, Native American and women students who pursue undergraduate and graduate degrees in science, mathematics, engineering and technology. Students in the program conducted computational sciences-related research projects under the direct supervision of an ORNL scientist or engineer.

They were greeted by Office of Science Director Ray Orbach at a closeout banquet on August 15, during his visit to ORNL for the on-site review.

RAM is supported by DOE’s Mathematical, Information and Computational Sciences Division, Office of Advanced Scientific Computing Research. ORNL research divisions hosting RAM students were the Computer Science and Mathematics Division, the Computational Sciences and Engineering Division, and the Networking and Computing Technologies Division.

Students participating in the program included Oluwatomisin “Tosin” Adeyeye and Ja’Nera Mitchom, Fisk University; William Burke, Lori Collins and Amara Diggs, City University of New York–York College; Dene Farrell, State University of New York–Binghamton; Talisha Haywood, Wofford College; Ryan Hurd, University of Notre Dame; Jason McKay, Morehouse College; and Timothy Salter and Valerie Spencer, Alabama A&M University.—Reported by Jodi Lockaby [ornl](#)



**RAM summer student Tosin Adeyeye of Fisk University explains her research project to Office of Science Director Ray Orbach.**

# Features of Defined Benefit Pension Plans

In response to questions and concerns from staff about the pension plan, ORNL Benefits has prepared some questions and answers describing the features of defined benefit pension plans and how they work. Read this material carefully to gain a better understanding of the investment policies, guarantees, and administration of our pension plan.

## What is a Defined Benefit Plan?

A defined benefit plan is a retirement program that pays eligible employees a specific, fixed amount or benefit during retirement. The plan calculates the benefit based on a formula, often a percentage of highest average pay multiplied by the years of service. Benefits are payable as an annuity for the lifetime of the employee, possibly continuing for the lifetime of his or her beneficiary.

In order to make pension benefit payments to employees at retirement, employers are required to make contributions to the plan. These contributions are supplemented by revenues gained through the investment of the plan assets. The employer bears the investment risk, and the investments are usually made by professional money managers.

## What has been the impact of recent events (Enron, Tyco, WorldCom) on our plan?

Our plan's investments are well diversified:

- 50 percent stocks
- 35 percent fixed-return investments (e.g., bonds)
- 15 percent cash, real estate, private equity funds.

Because of this diversification, the impact of holding stock in these companies has been less than 0.12 percent.

## How is the pension benefit guaranteed?

First, the pension funds are held by the Plan, separate from company assets. The Plan is currently overfunded, which means that there is more money in the pension fund than is needed to pay projected benefits. As of Dec. 31, 2001, our funding ratio was 118 percent, which is well above the 90-percent ratio we are legally required to maintain. The ratio has been trending down in recent years because of stock market performance, benefit payments and because we increased the multiplier from 1.2 to 1.4 and provided a cost-of-living increase to retirees.

Second, in the event that the Plan could not cover all the benefit payments due, the company would be obligated to make benefit payments from its own funds.

Finally, the Pension Benefit Guaranty

Corporation (PBGC), an agency of the federal government, insures certain benefits under the pension plan. If the Plan terminates without enough money to pay all benefits, the PBGC will step in to pay benefits up to certain amounts. The Plan makes an annual premium payment to the PBGC for this insurance. The PBGC program for multiple employer plans has reported a surplus since 1982 and remains financially sound.

## How is our pension plan administered and managed?

The pension plan is a multiple employer plan known as the Retirement Program Plan for Employees of Certain Employers at the U.S. Department of Energy Facilities at Oak Ridge, Tennessee (the Plan). BWXT Y12, L.L.C. is the sponsoring employer. The Plan is governed by boards of governors and managers composed of representatives from UT-Battelle and BWXT Y12.


A Joint Retirement and Savings Plan Committee bears fiduciary responsibility for the Plan. The boards of the participating employers appoint members of the Committee. As fiduciary, the primary responsibility of the committee is to run the Plan solely in the interest of participants and beneficiaries and for the exclusive purpose of providing benefits and paying plan expenses. Fiduciaries must act prudently and must diversify the plan's investments in order to minimize the risk of large losses. In addition, they must follow the terms of plan documents and maintain compliance with ERISA. They must also avoid any conflict of interest.

In general, the Committee is responsible for: (1) plan investments, (2) appointment, oversight, removal and replacement of other fiduciaries and service providers, and (3) oversight of the Plan Administrator.

The Committee does not make individual investment selections, but rather, sets strategic asset allocation guidelines and establishes asset categories for the Plan. The Committee retains qualified investment managers to manage the assets of the Plan and monitors the performance of the investment managers.

The Committee appoints and monitors the Trustee of the Plan and the Plan Administrator. The Plan Trustee is The Northern Trust Co. in Chicago, Ill. The Trustee performs financial accounting and reporting and conducts transactional activity for the Plan including benefit payouts. The Plan Administrator is BWXT Y12, L.L.C., and is responsible for the day-to-day operational activities associated with the Plan.

The Committee may retain independent consultants including legal, actuarial, investment and other advisors to review or assist in the review of Plan performance and compliance.

For more information about the Plan's investment policy and year-end performance data, see the Web, [www.y12.doe.gov/benefits/badmin/pension.htm](http://www.y12.doe.gov/benefits/badmin/pension.htm).—Kathryn Cogar 

# Service Anniversaries

September 2002

**45 years:** L. B. Shappert, Nuclear Science & Technology

**35 years:** Wayne Brooks, Craft Resources; Andrew Fadnek, Fusion Energy; Joseph B. Knauer, Jr., and Richard L. Wallace, Nuclear Science & Technology; Chain T. Liu, Metals & Ceramics

**30 years:** L. L. Dowdell, Laboratory Protection; D. Hale and James R. Rivers, Engineering; Ted Kaplan, Computer Science and Mathematics; Dennis W. Swaney, Fabrication & Site Services; Gail S. Sweeden, Communications & Community Outreach Dir.; Robert A. Vines, Engineering Science & Technology

**25 years:** Janice D. Allgood, Chemical Sciences; Teresa S. Baer and Jim C. Watson, Facilities Management; Mark E. Baldwin, Steven A. Hamley and Steve Sims, Operational Safety Services; Linda G. Berry, Brendan J. Kirby, Nancy A. Markham and Charles R. Schaich, Engineering Science & Technology; T. J. Blasing, Environmental Sciences; Stan A. David, Metals & Ceramics; Joyce A. Davis, Tim E. Golden, Glenn D. Morgan and Gordon L. Sanders, Craft Resources; John C. Glowienka, Quality Services; Ruby J. Henderson, Life Sciences; Jama B. Hill, SNS Deputy Project Director's Office; Ta-chang Liu, Communications & Community Outreach Dir.; John Sheffield, Energy & Engineering Sciences Dir.; Taner Uckan, Nuclear Science & Technology; Brian A. Worley, Computational Sciences & Engineering

**20 years:** Timothy S. Bigelow, Fusion Energy; Ralph G. Gilliland, Energy & Engineering Sciences Dir.; William B. Jatko, Engineering Science & Technology; Michael I. Morris, Nuclear Science & Technology

## Lagoon Rd. closing for year

Lagoon Road, a Laboratory access route favored by some commuters coming from the west, is scheduled to close at the end of September for construction work. The road is expected to be unavailable to commuters for about one year.

Construction of a cap over Solid Waste Storage Area 4, located along Lagoon Road, will extend over the existing roadway, says Environmental Management Programs' Dirk Van Hoesen. The Bechtel Jacobs-run project will involve relocating the road.

"A limited-use construction road will be maintained during this period for access to Melton Valley for essential work activities, emergency response and security patrols," Dirk says.

Commuters who have used Lagoon Road should access ORNL from Highway 95 via Bethel Valley Road.

# Family's Ground Zero experience was humbling

BY FRED STROHL

During our recent family vacation to the New York area, we took a morning to visit Ground Zero.

Before this summer, our family had visited the World Trade Center area four times during the past 18 years. It was always spectacular to view the Twin Towers glistening in the morning sun as we rode the ferry across the Hudson River into the city from New Jersey.

The ferry ride to New York this summer was different. The glistening towers were no longer there as we rode across the river. Even though the ferry engines were running at full throttle, there seemed to be almost an eerie silence as we sailed.

"This is a very haunting feeling," Donna said as we took Whitney, my 14-year-old daughter, and Cameron, my 21-month old son, along.

A year ago, we sailed past the twin towers on our way to the Statue of Liberty (five weeks before the attacks) and three years ago our family visited the top of the WTC for what would be the final time.

Memories of those visits to the area and others flashed through my mind as we walked toward the observation area that has been created for the public to view the scene. It looks like a giant quarry these days, but at the bottom you can see tunnel entrances our family walked through during our previous visits.

Although most of the debris has been cleared away, there is still plenty of rubble surrounding the area. There are also adjacent buildings that are being used but wear scars from the attack.

Viewing all of this was quite humbling, knowing that more than 2,000 innocent people lost their lives at this site. That scene has kept appearing in my mind in the month and a half since the visit.

As we left the area that morning, a large crowd was gathered a couple of blocks away, attending the dedication of an Irish memorial.

We later found out the president of Ireland was in attendance.

Although we were quite a distance from the podium, the voice speaking was familiar. After a few moments, I realized that voice was former New York Mayor Rudolph Giuliani. His words echoed a soothing sound as he talked about this part of the city rebuilding and moving forth to do great things. I have thought often of his words during the past month and a half, as well.

While it was humbling to view Ground Zero, the experience reinstalled in me that we as a people must not let the September 11 attacks deter us from doing everything that we do to make the world a better world in which to live.

In that regard, my visit to Ground Zero was therapeutic. [oml](#)

*Fred Strohl works in Communications and Community Outreach.*

## Komen Race, Memory Walk volunteers sought

Team UT-Battelle is forming a team for the 2002 Knoxville Susan G. Komen Breast Cancer Foundation Race for the Cure. This year's race will take place in downtown Knoxville on Saturday, October 19. Contact co-captains Nina Roberts (574-8945, [robertsnj@ornl.gov](mailto:robertsnj@ornl.gov)) or Wendell Ely (241-4588, [elywg@ornl.gov](mailto:elywg@ornl.gov)) to volunteer.

Team UT-Battelle is also participating in the Memory Walk 2002 event for Alzheimers disease research, to be held on Sunday, September 29. Team volunteers may walk and collect pledges for the walk or sponsor a Team UT-Battelle member. Contact Terry Payne, [paynetl@ornl.gov](mailto:paynetl@ornl.gov), to volunteer or for more information. Team registration ends September 16.

Number 41 September 2002

[Supercomputing initiative](#), page 1

[National Security mission](#), page 1

[State's JICS/ORCAS dedicated](#), page 2

[Lab Notes: Young visitor, tracking elements, Van de Graaff](#), page 3

[Summer students](#), page 6

[Pension plan facts](#), page 7

Inside



Fred Strohl

One year later, signs of loss, sympathy and gratitude are abundant around the World Trade Center site.

To stand on the top of the North Tower and view the entire city and well beyond was enough to take your breath away.

My wife, Donna, and I visited there in 1984 on a bright early June day. Donna does not like heights, but she loved being in the observation deck.

"I could stay up here forever," she said.

I have thought many times about her comment since Sept. 11.

**oml** reporter

P.O. Box 2008  
Oak Ridge, TN 37831-6146

PRSR STD  
U.S. Postage  
PAID  
Permit #37  
Powell, TN