ornl reporter

UT-BATTELLE

Number 31 October 2001

OAK RIDGE NATIONAL LABORATORY • U.S. DEPARTMENT OF ENERGY

The Mars debate

Was there life on the Red Planet? ORNL's SIMS technology contributes to the search for an answer

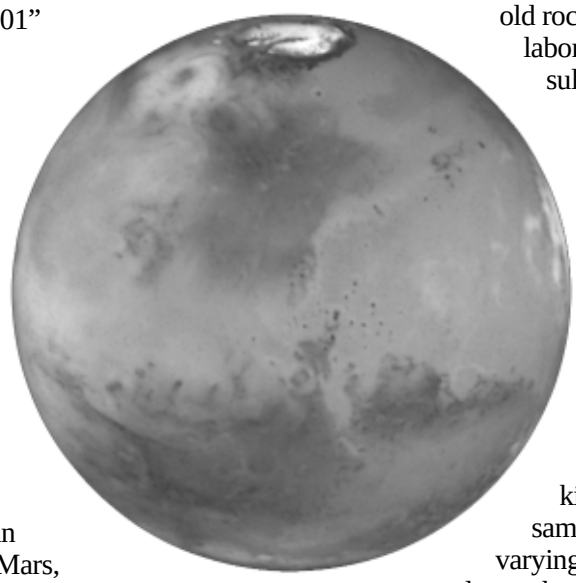
ORNL's Secondary Ionization Mass Spectrometry technology has played a role in the ongoing debate over whether meteorites from Mars contain evidence that life has existed on the Red Planet.

ALH 84001 is a chunk of rock ejected from Mars about 16 million years ago that made landfall about 13,000 years ago in Antarctica.

A rock more priceless than the Hope Diamond (or at least as unique—diamonds do, after all, originate on Earth), "84001" came to ORNL following NASA researchers' announcement in 1996 that microscopic globule structures in the rock could be interpreted as fossilized microbes and that other chemical characteristics could be inferred as evidence that life once existed on Mars. Skeptics cite other chemical processes and point out that the stone has been through a lot. The evidence, they say, is ambiguous.

On the one hand, SIMS analysis of "84001" doesn't yield definite evidence of organic processes. On the other hand, follow-up research using the Chemical Sciences Division's instruments supports a hypothesis about the existence of water on Mars—a necessity for life-as-we-know-it.

"The rock's really beat up," says CSD's Lee Riciputi. "It's a much older sample compared to most other Martian meteorites. It came from the older highlands of southern Mars, which is much more pockmarked by meteor impacts. The northern hemisphere is much smoother."



Lee, along with Jim Greenwood, a University of Tennessee post-doctoral researcher who was working with UT professor Hap McSween, used SIMS to analyze 84001. McSween was a prominent spokesman, and voice of caution, during the "life on Mars" announcement. UT's proximity to ORNL's SIMS facility gave McSween's research group access to one of only five or six such instruments available for these types of analyses.

Using the SIMS ion probe, Lee and Jim analyzed minerals in tiny fractures, many less than a tenth of a millimeter across, in the four-billion-year-old rock. The Mars rock was analyzed by a number of laboratories. Lee and Jim, however, focused on the rock's sulfur minerals in their search for signs of life.

"We were interested in examining sulfur because on Earth some microbes reduce it during biological processing, converting sulfate into sulfide, and at the same time enriching the sulfide in sulfur-32 relative to sulfur-34," Lee says. "In Earth's sedimentary rocks we find a lot of sulfide minerals such as the iron sulfide pyrite, which have sulfur isotope ratios enriched in S-32, indicating that 'bugs' were active in reducing the sulfate."

In fact, Lee has done work in the SIMS lab with sulfides from terrestrial systems, including samples from oil drillings, that have turned up signs of microbes several kilometers deep in the Earth's crust. In some of these samples, a single grain can display sulfur isotope values varying from 5 percent enrichment in 32-S to 7 percent depletion, almost the entire range found in all terrestrial systems. The researchers decided to look at the isotope signatures of 84001's sulfide.

"You have to start with the assumption that Martian life would work simi-

(See MARS, page 5)

New directorate reaffirms ORNL's commitment to advanced computing

ORNL's recent reorganization included the creation of a new directorate: Computing and Computational Sciences. Computers are at the core of the Laboratory Agenda; they are one of the foremost tools in areas of research that include the environment, materials, and genetics. Thomas Zacharia, who started his career as a research staff member in the Metals and Ceramics Division before becoming director of the Computer Science and Mathematics Division a few years ago, is the associate Laboratory director of the new directorate.

BY THOMAS ZACHARIA

Advanced scientific computing and computational sciences have a key role to play in our science and technology enterprise. In the past two decades, scientific computing has become an important contributor to all scientific endeavors. It has become crucial for research problems that are intractable by traditional theoretical and experimental approaches, hazardous to study in the laboratory or time-consuming or expensive to solve by traditional means.

By creating the Computing and Computational Sciences Directorate, ORNL reaffirms its commitment to the critical area of scientific computing. It is also a recognition that in addition to computing being an important Laboratory Agenda in and of itself, computational sciences is a key enabler of our Lab Agenda in physical sciences, biological and environmental sciences, energy and engineering sciences, national security and neutron sciences. Together, we are developing an integrated strategy for computing and computational sciences.

The Department of Energy has reinforced our vision with a $57 million program called Scientific Discovery through Advanced Computing (SciDAC). ORNL is playing a leading role in SciDAC, participating in at least half of the projects awarded—not surprising when you consider our broad and unique experience. ORNL has a history of evaluating the newest, most exciting computers and bringing them to production status. And ORNL researchers were responsible for the first scientific code to sustain 1 trillion arithmetic operations per second (one teraflop) in 1998.

Thomas Zacharia will lead the new Computing and Computational Sciences Directorate.

By working across the Laboratory, we have developed a leadership position in computational sciences encompassing materials science, environ-

(See ZACHARIA, page 2)

The Laboratory organization, October 1, 2001

ORNL's new organizational structure went into effect on October 1. Here are the revamped directorates, listed with their directors and divisions.

Bill Madia, Laboratory director

SCIENCE AND TECHNOLOGY
Lee Riedinger, deputy director for Science and Technology

Biological and Environmental Sciences Directorate
Frank Harris, associate Lab director
Environmental Sciences Division
Life Sciences Division

Computing and Computational Sciences Directorate
Thomas Zacharia, associate Lab director
Computational Sciences and Engineering Division
Computer Science and Mathematics Division
Networking and Computing Technologies Division

Energy and Engineering Sciences Directorate
Gil Gilliland, associate Lab director
Engineering Science and Technology Division
Fusion Energy Division
Nuclear Science and Technology Division

National Security Directorate
Frank Akers, associate Lab director

Physical Sciences Directorate
Jim Roberto, associate Lab director
Chemical Sciences Division
Metals and Ceramics Division
Physics Division
Research Reactors Division
Solid State Division

Spallation Neutron Source Directorate
Thom Mason, associate Lab director
Accelerator Systems Division
Conventional Facilities Division
Experimental Facilities Division

OPERATIONS
Jeff Smith, deputy director for Operations

Facilities and Operations
Herb Debban, director
Facilities Management Division
Infrastructure Planning Division
Engineering Division
Laboratory Protection Division
Logistical Services Division
Fabrication and Services Division
Craft Resources Division
Integrated Operations Support Division

Environment , Safety, Health and Quality
Kelly Beierschmitt, director
Environmental Protection and Waste Services Division
Health Services Division
Quality Services Division
Operational Safety Services Division
Records, Training and SBMS Services

Human Resources and Diversity Programs
Darryl Boykins, director
Employee and Organizational Development
HRIS and Employee Records
Employee Relations
Benefit Programs
Compensation
Staffing Management and Diversity programs

Business and Information Services
Greg Turner, chief financial officer
Accounting
Business Analysis
Business Systems
Research Business Management
Support Business Management
Contracts

Communications and Community Outreach
Billy Stair, director
Creative Media
Communications
Knowledge Management

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Curtis Boles

David Edington of Utilities and Reservation Services hangs the Stars and Stripes on Building 7012.

Zacharia

Continued from page 1

mental sciences and biological sciences, to mention a few. We expect this leadership to grow with the SciDAC projects in climate, astrophysics and fusion energy. High-end scientific computation and visualization technologies and tools are being developed that will enable researchers to see, interact with and analyze structures and behaviors of organic and inorganic matter more precisely than previously possible—from the tiniest building blocks of the universe, to the large-scale simulation of climate change.

Within the next five years, computers 1,000 times faster than those available to the scientific community today will be available. These advances have set the stage for a major step forward in modeling and simulation. However, to deliver on this promise, these increases in "peak" computing power must be matched by corresponding increases in the capabilities of scientific codes. The work of designing, building, tuning, integrating and using very complex high-end computing systems and applications is itself rigorously interdisciplinary and requires a high level of teamwork among researchers across the Laboratory.

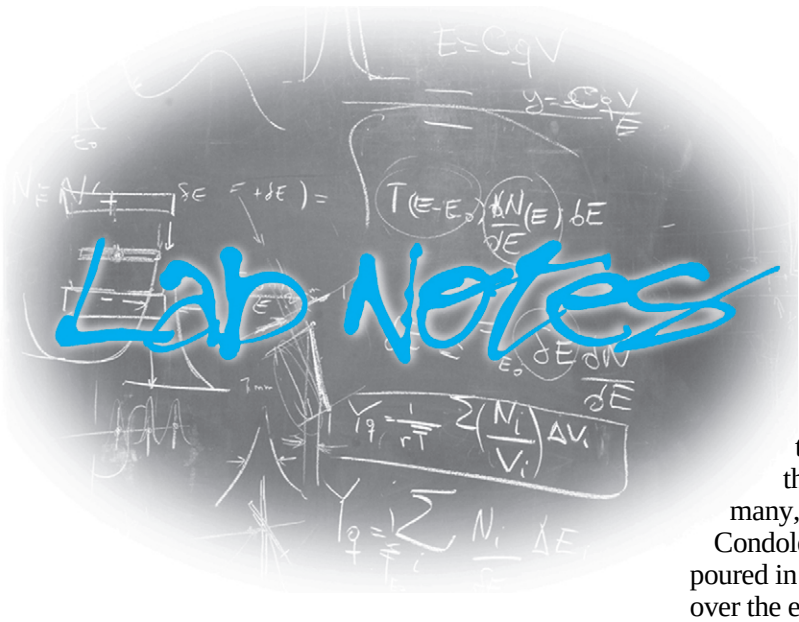
We are creating a leading scientific enterprise.

In October, the Laboratory is taking delivery of the new 4 TFlops IBM Power4 (Cheetah); literally the first such machine shipped anywhere, making ORNL a leader in open scientific computing. In addition, we recently signed a cooperative agreement with IBM to help develop the next generation 100 TFlops machine called Blue Gene. This is a major initiative by IBM and we are pleased to be part of this ambitious project.

One interesting challenge will be to develop algorithms that can work around CPUs that fail. Blue Gene will have literally hundreds of thousands of processors. New, fault-tolerant algorithms will be essential to the effective use of such terascale machines. This year's LDRD investment is also focused on developing the capabilities necessary to optimally utilize a 100-teraflop machine.

Our vision for Computing and Computational Sciences builds on our world-class staff. UT-Battelle's investment in the new private-sector computational sciences building will afford us best-in-class facilities. Add to that the University of Tennessee's strong commitment to the computational sciences agenda here at the Laboratory, and the state of Tennessee's support for the Joint Institute for Computational Sciences, and you can see that we are creating a leading scientific enterprise that attracts the best talents to ORNL.

Our ultimate success is dependent upon how well we integrate and support computational sciences to advance the scientific goals of the Laboratory. We expect to make great contributions to the scientific discovery process and the DOE mission. ornl



A new sense of purpose

September 11 started out like one of those rare days in early fall—crisp and clear—gratefully welcomed after a muggy summer. The good day didn't last long.

Shortly after 9 a.m. Lab staff members started to gravitate toward any television they could find to watch a series of horrors unfold, first in New York City, then in the nation's capital and then in a Pennsylvania wood.

The events of September 11 were hundreds of miles away from Oak Ridge, but they will no doubt have a lasting impact here.

Lab managers on that Tuesday immediately began to track down staff members who were on travel, even requesting co-workers who had heard from them since the tragedies to report the contact to their directorate offices. Of the approximately 200 staff members on travel, including Lab Director Bill Madia, all were eventually and relievedly accounted for (see Bill's message below).

Leadership and security team members met through the morning, coordinating with a state of heightened security across the DOE complex. Shortly before noon, Deputy Director for Operations Jeff Smith announced to staff members that they were dismissed to go home "and be with their families."

Work resumed the very next morning, but change was evident, most markedly at the entrances, where protective force staff scrupulously inspected vehicles that entered the fenced-in perimeters of the Laboratory. Delays were long at times. Roads to some of the more remote sites were closed to facilitate the increased security measures.

Some robotics technologies were sent to New York, along with staff members to operate them, to help with the rescue.

Tentacles of the tragedy reached into the Lab. A researcher reported that a colleague and friend died along with his family on the flight that crashed into the Pentagon. Another employee learned of the death of a high-school classmate, at the time an exchange student from Germany, in the World Trade Tower.

Condolences from scientists around the world poured in to their American counterparts at ORNL over the e-mail (see page 6).

The American Museum of Science and Energy remained open, but ORNL's public tour program was canceled. The Graphite Reactor Museum and Bethel Valley Church, located on the Oak Ridge Reservation, were closed. At press time they still are. Several meetings and at least one major conference were canceled.

Many plans for many people were ruined on September 11. In their place sprang a new resolve.

ORNL reaches out to NY firefighters

Tragedy often brings out the best in people. That was amply demonstrated on September 19, when ORNL firefighters collected donations for the families of hundreds of fallen comrades in New York.

The firefighters posted themselves at the ORNL entrances holding the customary empty boots used for their fundraisers. They got heavy pretty quickly; by the end of the three-hour collection period they had taken in approximately $10,000. UT-Battelle contributed another $10,000 to that sum. By the week's end follow-up contributions had swelled the total to nearly $26,000.

Curtis Boles

Bill Madia adds a $10,000 check from UT-Battelle to the firefighters' September 19 collection.

"I am overwhelmed by the generosity of our staff and by UT-Battelle's willingness to match such a large amount," Ryan Hargis, fire protection inspector and union officer for Local I-2, said. "We were stunned at the amount given in just three hours."

ORNL Director Bill Madia presented Ryan with UT-Battelle's check for $10,000 that afternoon. "All of us were moved by the courage of the New York firefighters, and I'm proud of the firefighters and staff here at ORNL who were so generous," Bill said.

New security program plan may change

Of things most immediately affected by the September 11 events is ORNL's Revised Access Control program. The Lab was counting down to October 1, when proximity readers on buildings would replace badge readers at the rotogates and the ORNL campus would open to traffic.

That date has slipped for obvious reasons. ORNL remains in a heightened state of security, which means more, not less, security at the entrances. The moves are prudent and reflect an increased awareness of security across the nation.

"We'll have to review a number of considerations. That includes the fences, access to buildings and level of security personnel," Communications and Community Outreach Director Billy Stair says.

Billy points out that although the new by-the-building system can actually increase security at the Lab, it may be desirable to alter the system to allow authorities to shut down access during extraordinary times.

The delay in the Revised Access Control program also means that ORNL's plans for providing parking after the east parking lot becomes a construction zone will change. Parking lots inside the fence, including the lot currently being expanded across from Building 4500-North's flagpole entrance, may not be available for commuter parking as soon as originally planned.

Plans to construct or improve parking lots inside the fence may be shifted to areas outside the fence so that as many new spaces as possible can be provided to commuters. Large sections of the east parking will lot close for construction of the new, privately funded facilities, which is still set to start sometime in November. With those changes in mind, we've included a map of how things will look for east-side commuters on page 4.

Reported by Bill Cabage

Bill Madia: 'I could not be prouder'

All of us were shocked and deeply saddened by the events of September 11. Many of our staff, including myself, were on travel. Thankfully, all returned safely. It is enormously gratifying to see how well Oak Ridge National Laboratory staff have responded to those events. Your generosity is overwhelming.

Our security staff have done a great job under difficult conditions and you all have shown the kind of patience I expected from this Laboratory.

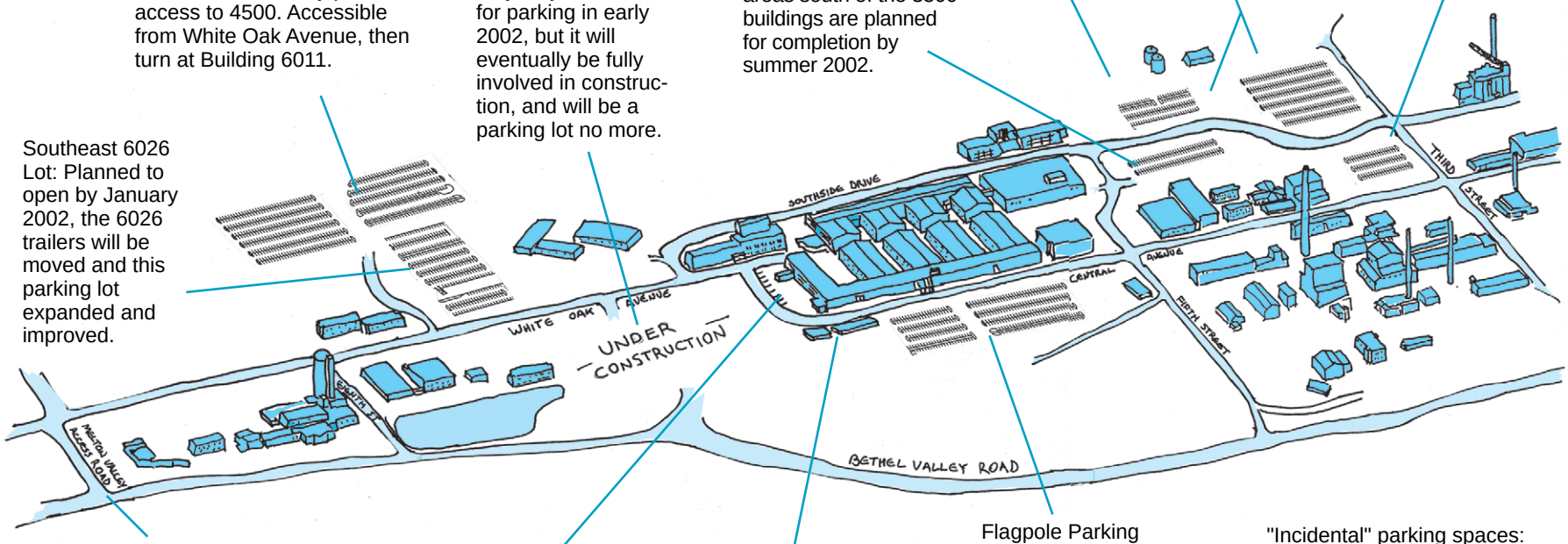
Our Laboratory was established in response to a national crisis. Our scientific strengths will no doubt play a role in the fight against terrorism that lies ahead. In the months to come, as in the past, Oak Ridge National Laboratory will once again contribute to the resolution of another global challenge.

I could not be prouder to be an Oak Ridger.

bill

Parking at ORNL

The shape of things to come on the east side include new lots, new morning routines, new facilities



Southeast Hill Lot: Expanded to around 500 spaces by late November 2001, this parking lot will be a major parking area for staff members in the East and Central complexes. A west-side walkway provides access to 4500. Accessible from White Oak Avenue, then turn at Building 6011.

East Parking Lot: Some of the north and east portions may stay available for parking in early 2002, but it will eventually be fully involved in construction, and will be a parking lot no more.

South Lot: The area nearest the HTML will be taken for a new annex for that user facility, but parking is still available to the west. Completion of the Pond Lots will provide ample parking in this area.

Pond Lots: Remediation of the holding ponds will provide a major parking area for the East and Central complexes. Work is scheduled to start in 2002; available in 2003.

Cafeteria Lot: Remediation of the South Tank Farm results in 55 spaces at the intersection of Central and Third Street, convenient to the Central Complex and the ORNL Cafeteria.

Fifth Street: Parking areas south of the 3500 buildings are planned for completion by summer 2002.

Southeast 6026 Lot: Planned to open by January 2002, the 6026 trailers will be moved and this parking lot expanded and improved.

Bethel Valley Road/Melton Valley Access: This intersection will become busier when the East Parking Lot access closes for construction. BVR/MVAR becomes a main access point for the East and Central Lab complexes.

Sixth Street: 30 auto and 2 motorcycle spaces were finished in early September 2001.

Visitor Center. The visitor reception area will remain in its current location for the near future.

Flagpole Parking Lot: Expanded this fall from 88 to 260 spaces. Use of this parking area will depend on recently heightened site security arrangements.

"Incidental" parking spaces: Numerous slots near buildings will be available for parking, subject to security restraints. Obey all traffic rules, and mind the spaces set aside for medical and other special permits.

New lots, like new facilities, will use 'sustainable' technologies when feasible

This map is a general approximation of parking availability on the east end of ORNL, between Third and Eighth streets, once construction on new facilities starts this fall. It includes some parking lots that are planned but not yet built.

The events of September 11 resulted in many changes in plans toward a more open campus, as outlined in the Lab's Revised Access Control program. Those changes will also change plans for parking. How the new parking areas inside the current perimeter fence will be used is currently being considered.

"The general plan for parking construction is subject to any future security changes," says Tim Myrick, who heads the Lab's modernization program. "The plan will be modified as appropriate to provide staff and government vehicle parking adjacent to and within the ORNL fenceline."

Tim notes that many of the new parking lots are "sustainable in design." In other words, similar to the new facilities that will go on the current east parking lot, they are being done with an eye toward the environment.

"Where it's reasonably feasible, the lots are being planned with state of the art runoff management systems, energy-efficient lighting, pervious concrete that reduces runoff by permitting water to pass through, and the use of recycled materials," Tim says. He has noted before that the Lab is placing its modernization contruction largely in "brown field" areas, meaning it's land that has been previously developed. As little green space as possible is being paved or built over.

Employees who routinely park in the east lot are encouraged, before construction starts, to become familiar with where the new or expanded lots are going to be and how they will be accessed. One good way to ease the demand on parking is by carpooling with a co-worker. ORNL has established a Web site to help with arranging ride shares at home.ornl.gov/carpool.—*B.C.*

Mars

Continued from page 1

larly to Earth's, and sulfide reducers have been around for a long time on Earth," Lee says. Analyzing the tiny sulfide grains in the meteorite with the SIMS ion probe required technical development, which in turn resulted in publication of a paper on the techniques. The work also required analysis of some of the other 13 available Martian meteorites to establish a base of reference.

"We analyzed eight or nine other meteorites to get a better idea of what processes might have affected sulfur on Mars, which seems to have a lot of sulfur on the surface, far more than Earth," Lee says.

The outcome of the Mars rock analysis would disappoint the life-on-Mars camp: The S-34/S-32 ratios were similar to unaltered, primordial values, showing no enrichment in S-32, and providing no evidence from which to infer life.

"We didn't see a life signal. We saw no evidence to say those sulfides were formed by sulfate-reducing bacteria; it's all explainable by inorganic processes," Lee says. "There was a bigger range of sulfur isotope values among Martian meteorites as a whole than we expected, but all are explainable by inorganic processes. We did see evidence of 32-depleted sulfur, which could have been derived from an atmospheric source.

"However, this would require that water transported this sulfur into the Martian crust, where it could be incorporated into the magmas."

Water. That's what piques UT post-doctoral researcher Rachel Lentz's interest. Mars is currently a very dry planet, but there is much evidence, such as erosion scars, that water once existed on the surface—that there were even floods. And Lee's SIMS analysis of sulfur isotopes in 84001 and other meteorites suggests active water circulation at some point in time.

"We can see in the Mars rock that it was exposed to water," says Rachel, a post-doctoral researcher who works with UT's Hap McSween. "Where did it come from?"

For that matter, where did Earth's oceans come from? One theory, say Lee and Rachel, is that terrestrial oceans originated from degassing of volcanic magma originating deep inside the Earth. Under pressure, the super-heated water is dissolved in the magma. But in a volcanic eruption such as 1980's Mount St. Helens, earthquakes or other events may "crack the vessel" and trigger a sudden release of pressure, forming steam and resulting in a cataclysmic blast that is largely steam powered.

"Hap talked to Jeff Ryan at Florida State University, who was working with lithium, beryllium and boron, because they behave similarly in magma," Rachel recounts. "Introduce water, however, and they behave differently. Lithium and boron are soluble—they'll be removed. Beryllium will remain."

That behavior, in fact, has been used to track water movement in subduction zones on Earth. Rachel wanted to look for similar traces in Martian rocks.

"But conventional analysis takes a lot of material, and we don't have a lot of Martian material. So we decided to use the SIMS ion probe," says Rachel. "ORNL's Cameca SIMS allows you to analyze very tiny areas. Even if there is a small amount of something, we can find it. We can detect parts per million and billion from a very small sample volume, smaller than the tip of a hair."

Rachel's theory was tested on several Martian meteorites, classified as shergottites and nakhlites, after the locations where they fell. "All of these meteorites were witnessed to fall, so there was less weathering on Earth and less contamination," says Rachel. "One of the minerals they contain is pyroxene—you can see two phases of growth. In nakhlites, the boron, beryllium and lithium behaved as we expected. But in the shergottites, the cores of the minerals had more boron and lithium than the rims, while beryllium increased in the rim.

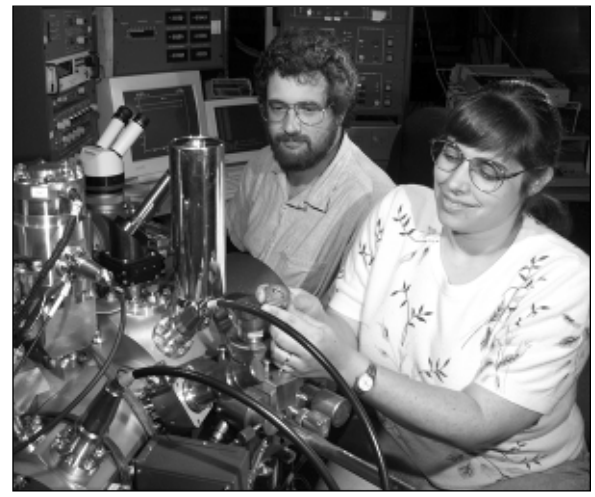
"They all should have increased in the rim. Something interfered with the boron and lithium. One possible explanation is water coming out of solution. At depth, water was in solution. As the magmas ascended toward the surface, water separated due to pressure release, taking boron and lithium with it, and left behind the insoluble beryllium," Rachel says.

"The old thinking about Mars is that the magma was bone dry. Maybe not."

Rachel and Lee refer to a series of published experiments at the Massachusetts Institute of Technology in which collaborators tried to grow their own Martian rocks from a mix of minerals identical to the makeup of the Martian specimens.

"They didn't grow right without water," says Lee. "However, if they exposed it to water and increased the water pressure, they got the closest composition to the shergottite meteorite."

"We're starting to find evidence that makes it more certain that there was water on Mars, and that is a prerequisite for life," says Rachel. That water, Lee adds, may have dissipated into space because Mars lacks the gravity and atmosphere to hold it, or it may be locked underground in permafrost. Despite the lack of life signs in the 84001 sulfides, both Lee and Rachel agree that the idea of life on Mars has fueled momentum for further, valuable studies.



Curtis Boles

Rachel Lentz holds a tiny sample of Martian terra firma in the SIMS Cameca Lab. Rachel is a University of Tennessee researcher working with ORNL's Lee Riciputi (left).

"Science often works best when somebody floats a really controversial idea," says Lee. "That triggers a lot of research, and it can trigger the public's interest."

Rachel admits that trying to determine the biological and even hydrological history of Mars from a pebble that arrived through nearly unfathomable happenstance is a bit of a stretch.

"It's like trying to infer Earth's makeup from a few rocks from Texas," she says. "Even using the rovers in the unmanned Mars Observer missions, we get a very small area, and we still don't quite know what they mean."

To Rachel and probably many other researchers, the only answer is—road trip.

"I want to go," she says, confirming that, given the opportunity, she would take that long, strange and dangerous trip to Mars. "Ultimately, someone is going to have to take a sledgehammer to Mars to sample rocks and study them the way we have studied rocks on Earth for the past century."—*B.C.* ornl

UT-Battelle adds $20,000 for Oak Ridge rowing facilities

Continuing its program of "legacy investments" for the Oak Ridge region, UT-Battelle is giving $20,000 to repair docks for the Oak Ridge Rowing Association at Melton Hill Lake. The gift follows a contribution last year of $30,000 by UT-Battelle to build a finish-line tower.

The gift will be matched by the city of Oak Ridge.

"We are thrilled that UT-Battelle is helping us enhance Oak Ridge's reputation as a great rowing facility," said Oak Ridge Mayor David Bradshaw. "Each regatta attracts 500 to 2000 rowers to Oak Ridge."

Tom Ham, president of the Oak Ridge Rowing Association, said the group has a great need to replace one of the three main regatta docks before the first regatta in early spring. "UT-Battelle's gift will make it possible to upgrade the dock to current environmental standards. Each improvement to our facilities brings us closer to being a Class A competition site and enhances our ability to attract national and international events. Our objective is to add more timing equipment, docks, cable and buoys, and to do necessary dredging at the start line," he said.

UT-Battelle Communications Director Billy Stair says the company's goal is to make Oak Ridge one of the nation's premier rowing venues. "We believe that investments in the rowing facilities will pay for themselves many times over in additional tax revenues for the city of Oak Ridge," he added.—*Marty Goolsby* ornl

‘Stand this hard tragedy with dignity’

The words “world class” have often been used to describe both ORNL’s standing in the scientific community and its aspirations. Shortly after the tragic events of September 11, ORNL staff members began to receive messages of condolence from all over the globe. Some of them read as if the attacks had happened locally. Some were from nations we might usually consider adversarial.

The messages underscore that the community of science is a community of the world, with many friends and colleagues in East Tennessee. Here are some of the missives received at ORNL.

We in Europe are shocked by this brutal act of terrorism.—*Austria*

We were deeply shocked to hear about the terrorist attacks and would like to—send you our deepest sympathy in this tragic situation.—*Germany*

What happened today makes me deeply sad and shows that human stupidity and nastiness has no limits.—*France*

A country which helped other countries should certainly have all our support to fight this terrorism.—*India*

We love America and interpret this attack as an attack to all our democratic countries. This will have the effect of strenghtening our relationship and cooperation. —*Italy*

This is not something that touches only the United States in its heart, it is a deliberate effort to attack civilization. We are with you in our thoughts.—*The Netherlands*

We wish to express our profound condolences for the fellow citizens that you have lost and we wish speedy return to health for the survivors of this tragedy.—*Turkey*

I feel with you deep sorrow as well as the abhorrence to those who make such nonsensical heinous crimes.—*Ukraine*

We hope that people of USA will stand this hard tragedy with dignity.—Republic of Kazakhstan

I wish you courage and self-mastery. My colleagues join me in expressing deep regret on the event.—*Russian Federation*

All of your colleagues all over the world are with you and shall fight so that our children and grand(children) could be given birth in a world governed by reasonable people who support the real peace of all the world.—*Japan*

We feel with you!—*Germany*

We want you to know that our spirits are with you (who) have suffered this despicable attack from people that use their riches and their own concept of God in the seek(ing) of power and human subjugation.—*Uruguay*

I hope Americans would recover from the terrible shock as soon as possible.—*South Korea*

To say that I am deeply shocked, moved and horrified is truly an understatement, the numbness I felt on the day continues to be with me as the consequences of these terrible atrocities continue to unfold. You are all in my thoughts and prayers.—*United Kingdom*

I assure you of my personal suffering in face of such painful attacks.—*Belgium*

I hope that the world will be able to handle this situation with—care, and not let the search for the persons responsible be the excuse—for indiscriminate vengeance.—*Denmark*

We, Russians, unfortunately well know... this is a very large tragedy for all the world. —*Russia*

We express our sympathy by observing one minute of silence.—*Finland*

We urgently must overcome those bad social situations in which many people must live throughout the world and in which such a hate against the free world is growing.—*Germany*

We kept yesterday a minute of mourning at 10 am throughout our country, initiated by the church bell of Stephanskirche (“Bummerin”) in Vienna.—*Austria*

Please, accept on behalf of your colleagues from Gosatomnadzor of Russia condolences over the tragedy caused by the terror attacks.—*Russia*

We all are in shock, what terrible tragedy! We present our condolences to families of all lost and I am sure that your Government together with intellectual people of the whole world will eradicate this evil—the terrorism—in root and severely punish them.—*Georgia*

The Russian people do know what terrorism means and share the Americans’ feelings. We are with you, and our joint cooperation will help us to win in our fight against the evil forces.—God bless you!—*Russia*

The Australian Society for Electron Microscopy Inc sends its deepest heartfelt condolences.—*Australia*

On behalf of the Microscopical Society of Ireland, I would like to extend deepest sympathy and condolences.—*Ireland*

Still our minds resist to believe that this happened. From this—small place in the world, (we) pray for all who have been touched by this irrational episode of history.— *Argentina*

I want to express my most decided disapproval to this kind of terrorist practices as well as my sincere condolences to the U.S. people.—*Cuba*

We are shocked by the terrible attacks of yesterday and in deep sorrow for the whole American nation.—*Belgium*

People of the countries which have experienced such acts of terrorism—and Russia is the one of them—too well understand what is going on in the USA now and what the people of your country feel.—*Russia*

The horrible attacks (affected) all the people around the world.—*Czech Republic*

I am too sad. Keep in touch if you can, a big hug to you, I really need one myself!—*Mexico*

I have followed this tragedy at a distance thinking (of) all of you.—*Argentina*

The unbelievable did happen.—*Canada*

I share with you the sad feeling for the tragic events. Let us pray for brighter, peaceful& safer future days to us all.—*Egypt*

Norway is a small country which is quite peaceful, so this is something that hit us just like it hit you.—*Norway*

It is very important to stand together at this moment and defend the values of democracy and the free world. Show respect for life.—*The Netherlands*

Let us not fill our hearts with hatred.—*China*

These days were the time of thinking about things that are usually beyond everyday interests and everyday life. I believe that every nation has dates that divide its history for “before” and “after.”

For Russia such a date was June 22, 1941, when Germany attacked us. I spoke to many people who witnessed those events, including my grandfathers—one of them started his military service in 1941 near Moscow and finished it in 1945 in Austria and the other was a partisan in the Don River area. All of them say that it was a great shock for them to find out that our country was not prepared for such an assault. Despite all the propaganda and patriotic songs confirming that we’ll beat an enemy on his territory, the Red Army suffered great losses and the country lost vast territory.

It reminds me of the situation of September 11 in the U.S. I visited your country six times and did that during rather hard and sometimes dangerous times in Russia. Each time I entered your country I felt myself safe and protected (of course I saw only a little part of your country).

I think this sudden realization of the constant presence of real and serious danger is a great trial for a nation. I have no doubts that the Americans will overcome the stress and shock from the recent events. Two years ago after the series of explosions of apartment buildings in Moscow, many people in Russia (were) afraid of going to bed in the evenings. Many others formed groups to patrol territory about their houses. Now we still understand that the danger is here but we learn(ed) to deal with the situation.

I’m sure that our governments will find a way of cooperation to eliminate the world terrorism. As for myself I see my mission in even more persistent activity to develop friendship and mutual understanding between people in our countries, to explain our citizens that we are alike and have a lot (in) common in our needs and problems. It is not much but it’s all I can do so far.

I wish you safety and strength of mind. We are thinking of you and praying for those who suffered from terrorists.—*Russia* ornl

Fix-it function to restart

Remember the days of the Fix-It Committee? ORNL management plans to restart the fix-it function, working through quality managers. ORNL Director Bill Madia has designated Deputy Director for Operations Jeff Smith to oversee the effort.

John Glowienka, quality manager in the Environment, Safety, Health and Quality Directorate, will be the program's coordinator and primary point of contact.

"I will be out and about at the Lab actively seeking improvement ideas," Glowienka, said. "In addition, I will use quality managers to help solicit ideas and facilitate solutions between organizations and the organizations and individuals who have the expertise to solve the problems. We're going to identify the problem and get it on senior management's screen until it gets solved.

"Employees are always encouraged to share ideas with their immediate managers and, of course, Bill Madia will continue to have an open-door policy and host brown bags," John continued. "The Fix-It Committee provides an additional avenue for staff to express ideas and a focal point for senior managers to use when we simply need to fix it."

More information will be forthcoming. Questions should be directed to John at 241-4133, glowienkajc@ornl.gov.—*Fred Strohl*

New equipment gives F&O's sign painters a productivity and pollution-prevention boost

ORNL's Sign Arts and Paint Shop has a new process that does two things better. It makes better color decals and signs and it reduces the waste stream involved in producing them.

In fact, where there were once some particularly troublesome chemicals to dispose of, there are now barely any by-products at all.

The new process, called a Gerber Edge thermal transfer system, produces decals and signs digitally from a printer-like device. Making them previously required a printing process called silk-screening that involves inks and cleaning solvents.

"The lacquer thinner was the biggie," says planner-estimator Norty Payne. "This process takes away the silk-screen process, which has an expensive-to-dispose-of waste stream of about five gallons of lacquer thinner a week to thin the ink and clean out the screens."

Norty Payne

The Sign Arts and Paint Shop's Gene Moody and Brenda Griffith display some of the signs and decals they can now produce faster and practically pollution free.

The process also eliminates a lot of smelly fumes. Silk-screen is a particularly pungent process. And the equipment doesn't require nearly as much maintenance, says Norty.

The signs the Reservation Services shop produces range from hazardous materials decals to road signs and magnetic decals. Not only does the shop produce them cleaner, but Norty and painters Gene Moody and Brenda Griffith are also producing better looking signs. The shop can produce signs from their own artwork or from others, such as the Lab's Creative Media graphics shop.

Brenda explains that the new digital process allows them to design a sign on-screen using desktop software and print it with either spot colors or process colors, depending on the application, with digital precision. A new cutting machine will align and trim the sign perfectly. Stickers now come on a paper stock that users in the field can easily peel—a real help to workers who must apply decals to hazardous materials with gloved hands.

"All our vinyl signs will last seven years outside. Plus we use thicker metal than most of the signs purchased elsewhere," Brenda says.

The cutter can actually cut stencils automatically. That came in handy recently as the new parking spaces along Sixth Street were completed.

"We received a rush order for stencils that would have required a weekend on overtime to complete," Norty says. "The new system did it in a couple of hours."

With the quicker process and elimination of hazardous chemicals, the Sign Arts and Paint Shop can now pass their savings on to their customers, who come from the Lab and all over the DOE complex. "The process also assures that these Facilities and Operations personnel have committed to better service, pollution prevention and thus, waste reduction," says Work Center Manager Faye Brewer.

If you need a sign, the ORNL shop can make it for you better, faster and cheaper than ever. Call Norty, Brenda or Gene at 576-0552 or 241-5210.—*B.C.* ornl

Service Anniversaries

October 2001

40 years: Elder R. Mellon, Plant and Equipment
35 years: John F. Cooke, Solid State; Donald M. Kroeger, Metals & Ceramics; Elaine B. Slaten, Office of Audit & Mgmt Services; Mack A. Davis, Logistical Services; William D. Brickeen, Engineering; W.T. Roberts, Instrumentation & Controls
30 years: David L. Bowling, Plant and Equipment; Thomas C. Jernigan, Fusion Energy; Jeffrey L. Bailey, Metals & Ceramics
25 years: J.J. Lynn Jr. and Brenda J. Smith, Instrumentation & Controls; Brenda L. Griffith and John E. Hensley Jr., Plant and Equipment; Jim Conklin, Susan D. Jennings, Samuel C. Nelson, Jr., Engineering Technology; Art Clemons, National Security Directorate; Kathy S. Gant and Susan W. Diegel, Energy; Leonard S. Dickerson, Jackie J. Jernigan, Jim R. Travis, and Charles W. Alexander, Chemical Technology; Neena R. Woods, Metals & Ceramics; Jenny L. Keller, Business & Information Services Dir.; Larry D. Voorhees, Environmental Sciences; William (Bill) B. Whitten, Chemical & Analytical Sciences; Darrell K. Thomas, Solid State;Terry L. White, Fusion Energy; David W. Foster, Logistical Services; Carrol R. Bingham, Physics
20 years: Sandy J. Bolinsky, Contracts; Rodger D. Bradley and Dennis C. Haley, Robotics and Process Systems; J.J. Kulesz, Computational Physics and Engineering; Sandra B. Levine, Operational Safety Services

ORNL people

Three ORNL research staff members are finalists in the Knox area YWCA's Tribute to Women. **Patricia S. Hu, Betty Mansfield** and **Marie Walsh** are the nominees for the science and technology category. Patricia directs the Lab's Center for Transportation Analysis, where she's led many projects for DOE and the Department of Transportation. Betty works with the Human Genome Project through the Life Sciences Division. Marie is an internationally renowned researcher on biomass energy systems in the former Energy Division.

A presentation titled "Polymorphism, Phase Transitions, and Thermal Expansion of $K_3Lu(PO_4)_2$," by **Matt Farmer, Lynn Boatner, Brian Chakoumakos, C.J. Rawn** and **J.C. Bryan** received the Pauling Poster Prize and the 2001 Oxford Poster Prize at the recent annual meeting of the American Crystallographic Association. Matt, the lead author, is a graduate student from Baylor who worked in the Solid State Division.

Bruce Moyer of the Chemical and Analytical Sciences Division was recently named co-editor of the refereed international journal *Solvent Extraction and Ion Exchange*.

Miraculous sight

With new technology and co-workers' support, Terry Alton can see

Two years ago, Terry Alton was legally blind. Today, thanks to new technologies and the support of his co-workers, he drove himself to work.

Terry, who works in ORNL's Accounting department, has been afflicted since birth with a range of sight impairments that left him practically sightless. As a result, Terry recognized relatives, friends and co-workers by the sounds of their voices and depended on them to get him to work and other places most of us go to with little thought.

"We're talking school for the blind, which I attended from 1962 to 1975," Terry says. His impairments include severe myopia, a lack of pigmentation in the eye and a defective area in the macula, the region of the eye where the optic nerve joins the retina.

Terry came to ORNL's Accounts Payable from Y-12 after a work-force reduction in late 1999, barely escaping a pink slip. Before he left Y-12, a co-worker suggested LASIK surgery to him. Terry had it done, and it made a marked difference.

"LASIK took me to 20/120, better than I had seen with glasses—about 20/400-800," he says. "It helped the myopia, making images larger and clearer, similar to the difference between wearing contact lenses and large, thick glasses."

The real difference, however, is a device attached to his glasses, called a Keplerian autofocus device. About the size of a pair of opera binoculars, the device uses stepper motors and an infrared transmitter and receiver diodes to measure the distance and focus on what he is looking at. Using the device required some intensive training.

It was well worth it, Terry says. "At age 45 my life totally turns around. On August 17, I passed the driving test and I'm driving to and from work!"

Terry says that ORNL management and colleagues were "very instrumental" in buying the special glasses. The Lab reimbursed him for them, in fact. While the surgery corrected his myopia, the autofocus glasses correct the problem with the macula.

"Instead of little cells being joined together in the macula to define small things, in mine the cells are spread apart—not grouped tightly enough. With these glasses, that pretty well fixes that. LASIK helped the myopia."

Terry's currently seeing 20/50. An obvious question is: What sort of effect does having sight after a lifetime of virtual sightlessness have on a person? Like being able to see unknown details such as "the leaves on the ends of the trees"?

"What's it like? It's hard to describe—a godsend, basically speaking. It's a miracle," Terry says. "It takes getting used to, because my first inkling when I want to go to the grocery is to call someone. It's really nice not having to prearrange. Never had I brought myself to work.

"I can see people's faces coming down the hall, without having to recognize their voice or wait for them to speak. I had enough sight to be mobile enough in the buildings to get around, but because I was unsure who was coming by, I wouldn't speak. I occasionally wondered if people thought I was socially inept, but I was just unsure who was approaching until I heard a voice."

Terry's miracle has been a boon for the Lab as well.

"I'm a lot more productive. I am an auditor for Accounts Payable. I, along with my co-workers, am responsible for accurate payment and tracking of invoices. My count went up ten- to fifteenfold. I did roughly 16 invoices a month before. Since I've gotten used to these glasses, my count has increased to 186."

Curtis Boles

Terry Alton and his high-tech specs.

He says he no longer has backaches and headaches from hunching over a computer screen trying to see it. But it hasn't been easy. Using his new equipment required intense training and therapy, and Terry credits the patient support of the Lab and his co-workers in Accounts Payable for his progress and new productivity—people like manager Joel Lay, Margaret Gould, Beeb Benson, Jim McKinley, Jenny Keller and Barbara Bullock.

"I still have a ways to go, but the more you use these things the better you get. Over the last year or so, I've gotten a lot better at it. I don't have to memorize terrain—I memorized my path into my work place. I take myself to church, the grocery and to work. It's fantastic.

"Everything was two-dimensional before. Now it's 3-D. Two different things; night and day," Terry says.

"Productivity and self-esteem—those are the biggest benefits. There are some priceless, intangible things that have come out of this."—*B.C.* ornl

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