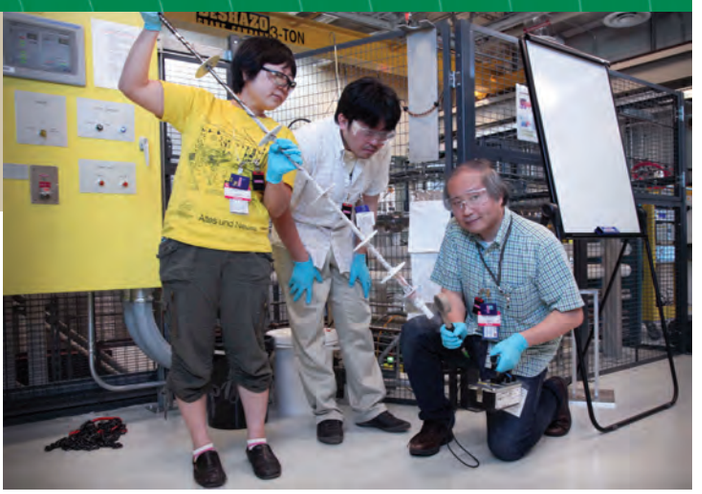
OAK RIDGE National Laboratory
Reporter
Retiree Newsletter
July 2011

SCIENCE

ORNL hosts displaced Japanese researchers



Maiko Kofu, Atsushi Nagoe and Osamu Yamamuro examine their sample after running an experiment at SNS.

In addition to donating $20,000 to aid in the Japanese earthquake and tsunami relief efforts, ORNL is helping displaced Japanese colleagues in neutron science continue their research.

ORNL joined a city of Oak Ridge effort with a $20,000 donation to Oak Ridge's sister city of Naka, Japan, to repair a local school damaged during the earthquake. Staff contributions came through Team UT-Battelle, a UT-Battelle corporate gift and ORNL's Asian Pacific American Committee.

Throughout the course of the summer, ORNL's Spallation Neutron Source and High Flux Isotope Reactor will host various groups of Japanese scientists unable to continue their research in their usual facilities.

The Japan Proton Accelerator Research Complex, located in the quake stricken northern section of the country, was shut down when the mercury target shifted several inches from its base, halting experiments taking place on site.

Because of the fast-paced nature of this kind of scientific work, the management team at SNS decided to grant beam time to J-PARC-affiliated researchers whose projects were interrupted by the disaster. A number of proposals from JPARC researchers were reviewed and three were assigned beam time in June by Georg Ehlers, the lead instrument scientist for the SNS's Cold Neutron Chopper Spectrometer.

The second of the three sets of researchers, a group of three physicists from Tokyo University, are using the CNCS to investigate the basic science that governs an ionic liquid that could help uncover the origin of the boson peak. The scientists hope to return to ORNL to continue their research. J-PARC is expected to be out of service until the end of the year.

"We have similar facilities at J-PARC," Osamu Yamamuro, an associate professor at Tokyo University said, "but I think each facility has its own unique character, and this facility has an orientation to basic physics, so I think that is very useful. We wish to come here until J-PARC is ready again."

A group from Tohoku University, near Sendai, conducted work earlier at the CNCS and another set of researchers will fly in from Tokyo University to continue their interrupted experiments. The Japanese scientists currently visiting say they have felt at home while working at SNS.

> "I think ORNL is very user friendly. The system is very good."

"I think ORNL is very user friendly," Maiko Kofu, a research associate working with Yamamuro at Tokyo University said. "The system is very good."

In all, SNS has accepted 24 proposals from J-PARC researchers who will use the facilities before December.

—*Miriam Kramer*

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Joy Castleberry loves travel in retirement

The Castleberry family poses for an Easter Sunday photo. Pictured in front, left to right, are Marleigh, Emmy, Clara and Anna. Standing behind them are Mark, Christy, Joy, David and Jeff. (Photo submitted).

Joy Castleberry and husband David call East Tennessee home, but over the last few years, they have traveled from Alaska to Aruba.

"Traveling is a great way to enjoy retirement," Joy said recently, just before taking off for a beach vacation with her family in Hilton Head, S.C. "It is a great way to spend some time and enjoy life in places you have only read or heard about before."

Joy and David, a retired pipefitter from Y-12 and former president of Local 718 of the Atomic Trades and Labor Council, have spent much of their travel time on cruises.

"David and I have taken cruises to Alaska, the eastern coast of Canada and the Caribbean," says Joy, who arrived at Y-12 as a secretary in 1966 and retired from the Lab in 2009 after serving as the long-time secretary to Kelly Beierschmitt, now Associate Laboratory Director for Nuclear Science & Engineering. "Alaska and eastern Canada may be some of the prettiest places in the entire world, and everyone needs to see them. You'll never forget the experience."

While the Castleberrys have spent a lot of time on cruise ships, they've enjoyed other travel destinations, as well. "We've gone to Hawaii, Aruba, Yellowstone National Park and Las Vegas," says Joy. "Of course, we've taken some family vacations to Hilton Head, as well."

Family vacations are very important to the Castleberrys. "David and I have always been close to our two sons, Jeff and Mark, and that closeness extends to their families," says Joy, stressing the importance of the Hilton Head family vacation. "The more all of us can do together, the better."

> "The more all of us can do together, the better."

"David and I are proud of what our sons have accomplished so far and the potential they both have to make an impact in the future through their respective careers," Joy says.

Son Jeff is vice principal at Gresham Middle School in Knoxville's Fountain City area. He formerly taught at Knoxville's Austin East High School, where he also coached basketball. He and his wife, Anna, have two daughters, 8-year-old Clara and 6-year-old Emmy.

Before deciding to change careers, Mark taught and coached boys' basketball at Oliver Springs High School. After graduating from UT's law school, he passed the bar and established a successful law practice in Knoxville. Mark and his wife, Christy, are parents of a daughter, Marleigh, age 11, and are expecting another child in August.

"We love our granddaughters, but we're finally going to have a grandson," Joy proudly announces. Joy and David share the excitement with Mark's father-in-law, Jerry Walker, who worked at ORNL in transportation technology before retiring a few years ago.

Joy has done some secretarial work since retiring from ORNL and also enjoys playing piano as a volunteer at Grace Baptist Church in Karns and the Autumn Care Assisted Living Center in Knoxville. "I am a people-oriented person and these activities allow me to stay people-oriented," Joys says.

Joy's memories of the people she worked with at both the Lab and Y-12 are important to her. "I worked with great people from the time I started in Oak Ridge," Joy says. "I'm fortunate in that I've been able to keep in touch with a lot of those folks."

"My career at the Lab was rewarding, but I'm so grateful David and I are able to fully enjoy our retirement and all the advantages that go along with it."—*Fred Strohl*

Reporter is published for retirees of ORNL, which is managed by UT-Battelle for the U.S. Department of Energy.

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DOE program reaches thousands of students with 'farming for fuels' program

More than 34,000 youngsters, teachers and parents around the country have had a chance to learn about bioenergy through hands-on experiments that are part of an outreach effort by the Department of Energy's BioEnergy Science Center.

In collaboration with the Creative Discovery Museum in Chattanooga, Tenn., BESC staff at Oak Ridge National Laboratory and the University of Georgia developed lesson plans aimed at children in fourth, fifth and sixth grades. The program, called "Farming for Fuels," teaches students basic concepts such as the carbon cycle, the use of lignocellulosic biomass as substrate for the production of biofuels, and the technical and economic obstacles to a bio-based fuel economy.

"We have incorporated hands-on experimental work stations that allow students to understand fundamentals of the complex nature of plant cell walls; the issues affecting the use of food vs. non-food crops to produce biofuels such as ethanol; and the mechanical differences between cars run by hydrogen, solar and wind power," said Sue Kral, director of outreach activities at the Creative Discovery Museum and part of the BESC team.

In the 800-plus school classroom sessions or 60 family science nights conducted over the last 2 years, students and their parents have had a chance to learn the differences between annual crops like corn and perennial crops like switchgrass and discuss why perennials are more sustainable.

Another activity involves testing the sugar content of different liquids and discussing how yeast ferments the sugar into ethanol for biofuels. Students and their parents also got to use a microscope and see the differences between plant cells with their thick cell walls of cellulose and animal cells with thin cell membranes. These lesson plans and a "kitchen science" version of the lessons are posted on the BESC Web site: http://bioenergycenter.org/students-and-kids/teachertools/lessonplans/farmingforfuel/intro.html.

"It is gratifying to see the children and their parents and teachers so excited about the science," said Janet Westpheling, BESC activity lead for Education and Outreach. "A real benefit of the program is to introduce these concepts in a context that not only informs the public but also makes it fun."

BESC piloted the program with the Creative Discovery Museum and then expanded the effort with regional museums and centers in the Southeast in the first two years, including partners at East Tennessee Discovery Center in Knoxville, Tenn., the Hands On Regional Museum in Johnson City, Tenn., the Lichterman Nature Center and the Pink Palace in Memphis, Adventure Science Center in Nashville, Tellus Northwest Georgia Science Museum in Cartersville, Ga., and the National Science Center in Augusta, Ga.

In 2010, the program was expanded with museums from six other states–Texas, Michigan, Illinois, Florida, New York and Arizona–and these museums will act as hubs for national outreach.

"The combination of educators, museums, and university and national laboratory staff have allowed this program to be successful," said Brian Davison of ORNL's Bioscience Division.—*Ron Walli*

Students learn about bioenergy through hands-on experiments in the "Farming for Fuels" program.

Club ORNL events

Get the details and latest news online via https://info.ornl.gov/sites/clubornl. Request an XCAMS account, which will allow you to participate in these events or contact Lara James at 865-576-3753 or jamesla@ornl.gov.

August 5	Chicago
August 27	White Water Rafting
September 1	Crimes of the Heart Oak Ridge Playhouse
September 3	UT vs. Montana Football Game
September 10	Chattanooga Day Trip
September 10	UT vs. Cincinnati Football Game

Retirees included in charitable giving options

ORNL has set the standard for DOE national laboratories, exceeding $1 million in 2008, 2009 and 2010 in combined ORNL employee and Battelle corporate giving to the United Way of East Tennessee.

"We hope you will continue in the ORNL tradition of generous support of the United Way and encourage you to consider having your contribution automatically deducted from your monthly pension check or make a one-time contribution," Payroll Services' Patrick Lewis said.

The "payroll deduction" option is available to retirees, and any changes will be reflected in the next regularly scheduled pension payment. You may contact Payroll Services at (865) 241-5624 or e-mail brewsterjl@ornl.gov for any questions regarding how to support the 2011 campaign. "On behalf of the entire United Way effort at ORNL, thank you in advance for your support," Lewis said.

Checks made payable to "United Way" may be mailed to the following address:

ORNL United Way Campaign
P.O. Box 2008, MS-6438
Oak Ridge, TN 37831-6438
Attn: Jackie Brewster

Coach Cuonzo Martin tips off United Way campaign

UT basketball coach Cuonzo Martin tipped off the 2011 United Way campaign on Monday, June 13, introduced by this year's campaign chair, Johney Green, Jr.

Martin, who is beginning his first year as UT coach, may be new to Tennessee, but he's been acquainted with the United Way for some time. He recalled while on the Purdue University staff he learned "quick and early" how seriously support for the United Way is taken. More recently, he joined a Red Cross disaster relief fund tour of flooding in Memphis and storm damage in Greeneville.

"What United Way does is exceptional," Martin said.

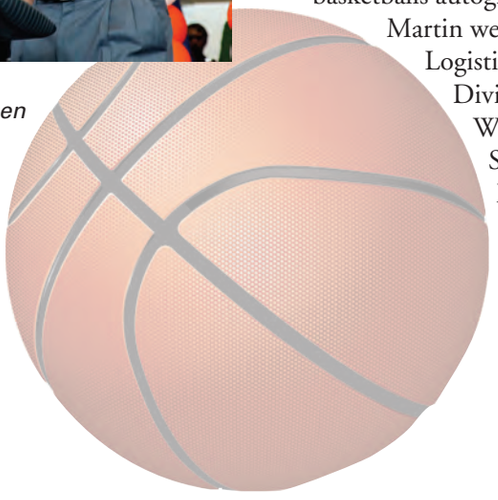
Lab Director Thom Mason noted that United Way support is more critical than ever in a continuing tough economic climate. "The impact of what we're doing here today and what we do around the year with our contributions is felt all across the region. Literally thousand of lives are impacted. I expect us to exceed our $1 million goal," he said.

Coach Martin with women's division free-throw champion Belinda Loi.

2011 United Way Chairman Johney Green and Coach Martin address the crowd at this year's kickoff event.

Winners of the free-throw contest at the campaign kick-off were, men's division, Jason Craig, who works in the F&O Glass Shop, and, women's division, Belinda Loi of the Physics Division. The NScD Research Reactors Division's Ron Crone won the corn toss.

Door prize winners included Bev Kay, Measurement Science & Systems Engineering Division, who won two UT football skybox tickets. Winners of the basketballs autographed by Coach Martin were David Denning, Logistical Services Division, and Eric Weber, Computational Sciences & Engineering Division.



Building 1059 renovations earn EStar Award

Winning the Environmental Sustainability Star (EStar) is like winning an Oscar for environmental sustainability. DOE sites nominate projects that demonstrate sustainability being integrated into projects on site. In October, a team made up of supervisors, facilities engineers, students, craft workers, and planners at the Lab will receive this award for the work they've completed on Building 1059.

"1059 is one of fifteen generic office buildings onsite," says Ann Bryant, a West Complex Facilities manager. Bryant led the project as a part of ORNL's Sustainable Campus Initiative.

"We gutted and renovated the entire facility, using local recycled-content materials and energy efficient equipment, making it more energy efficient," says Bryant. "Using recycled content, we were also able to recycle/repurpose/reuse 97% of the durable goods and construction waste from the clean-out and demolition," she said.

Some of the renovations included installing low-flow faucets and dual-flush valves, which increased water efficiency in the building by 49 percent. Hand dryers were also installed in the bathrooms, eliminating the large amount of waste resulting from paper towel use.

A cool, unique feature added to the building is an energy awareness dashboard, a flat-panel monitor located in the lobby of the building. The monitor shows up-to-date information about the building's electricity and water use.

From left to right: Supervisor Mike Mitchel, Planner Debbie Moore, West Complex Facilities Manager Ann Bryant, Supervisor Gary Fraker, Facilities Engineer Bryce Hudy, UT Student Gary Hathaway, Facilities Engineer Brandy Milun.

Enhanced lighting sensors were installed, as well. The sensors can determine whether or not a room is occupied, and if not, the lights will shut off automatically. Daylight sensors were also added. These sensors regulate the level of artificial lighting in a room, based on the amount of natural light coming through the windows.

Renovations were also made to the building's exterior. The roof was upgraded and replaced with a white reflective roofing material with added insulation to reduce the heat load. Also, the landscaping around the building includes native plants, to eliminate the need for an irrigation system. "The installation of a building automation system (BAS) was one of the most valued improvements," says Bryce Hudey, a Facilities Engineer in the West Complex.

BAS is a network of sensors and controls that allow modulation of heating, ventilation and air conditioning to maximize energy efficiency within a building. The BAS capability for Building 1059 was customized to incorporate consumption monitoring. Circuit monitors were installed on every circuit and tied into the BAS, which enables the facility engineer to monitor electrical consumption at the point of use. This capability has aided in identifying equipment maintenance issues, as well as opportunities for efficiency gains.

In addition to being one of only three recipients of the EStar award, for which some 186 facilities were nominated, the year-long renovation project earned Building 1059 a gold certification as a Leadership in Energy and Environmental Design for Existing Buildings (LEED-EB) designated facility. It also earned a DOE Office of Science "Best-in-Class" award. The team is also being submitted for the GreenGov award.

"Many sustainable measures used in the Building 1059 renovation are being replicated in the 14 other "generic" building renovations, with the anticipation of eventually more LEED-EB certifications being earned," says Hudey. ORNL hopes to have 10 buildings LEED-EB certified by 2014.

Among the sustainability policies developed for the project that are being implemented site-wide are routine inspections and equipment maintenance that ensure sustainability is incorporated into daily operations. One example of this is a site-wide Integrated Pest Management contract that ultimately reduces the amount of chemicals used for pest control.—*Jana, a summer intern working in the Integrated Operations Support Division in F&O's Student Program, is an ORNL "Legacy." She is the daughter of the late David Milan, who served as head of the Lab's Emergency Management Department.*

"ORNL hopes to have 10 buildings LEED-EB certified by 2014."

THE NEWS
OAK RIDGE NATIONAL LABORATORY
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LIQUID METALS PROJECT REQUIRES MANY TECHNIQUES—(1) Technician James E. Pope places his hands in the rubber gloves built into the dry box and fills one of the toothpaste-tube-like containers with a medium and a tiny metal specimen preparatory to its being placed in a furnace filled with purified argon or helium to keep water and oxygen out. (2) With the specimen ready for the furnace, Proaps sets the temperature controller on one of the eight furnaces used in the project. Shown are the four globar tube furnaces in which the hot zone is two and a half inches long. (3) Now ready for the stripping operation, the specimen is freed of the container which is titrated to determine the total amount of sodium or lithium that has reacted. Here is Metallurgist L. A. Abrams, left, and Technician J. R. White is making the weight changes of the specimen on a gram-atic balance is Technician R. S. Webb. Titration shows when the solid metal has dissolved into the sodium solution, or that some of the solid remains on the specimen.

Aluminum To Zirconium Specimens Studied In Liquid Metals Project

Tubulating, quenching, evacuating, stripping, titrating, mounting and intergranular penetration are big words to apply to a specimen only three-fourths of an inch long, three-eighths of an inch wide and .020 of an inch thick, but, as part of a liquid metals program, that's what's been going on for about 18 months in one section of the Metallurgy Building at Oak Ridge National Laboratory. This Division is under the administration of Dr. John H. Frye, Director, and E. J. Boyle, Associate Director.

With nearly three-fourths of all the elements being metals, everything from aluminum to zirconium, or from low to high atomic weights, is being studied. The liquid or corrosive mediums generally used are mercury, potassium, sodium, lithium, bismuth, aluminum, zinc and lead, and metal specimens are placed in them and later studied for changes in size, weight, structure and physical appearance.

The tubulating technique involves evacuated toothpaste-tube-like containers made of the same material as the specimen inside. These tubes are filled with a low-melting metal, plus the specimen, evacuated and then welded closed. Next, the sealed tubes are placed in a furnace, where they stay for various time lengths ranging from one to 1,000 hours and at temperatures up to 1,850 degrees Fahrenheit.

Filled with about 10 cubic centimeters of the metallic li[illegible]e-dium plus the metal [illegible]he

11 ORNL Scientists On 3rd Engineering Symposium Aug. 27

Eleven ORNL scientists will be on the program of the third annual Oak Ridge Summer Symposium presented by Oak Ridge National Laboratory and the Oak Ridge Institute of Nuclear Studies August 27-September 7.

Sponsored by the American Society for Engineering Education, the symposium subject will be "The Role of Engineering in Nuclear Energy Development." Morning sessions will be held at the Center Theatre and two evening sessions will be in the Oak Ridge High School Auditorium.

Invitations have been sent to all members of the Society in the Southeast, to 400 industrial [illegible]

Metals In Human Body To Be Studied By U-T, ORNL

How much radioactive metal is "permissible" in the air and in the water before it is dangerous to the human body?

One of the first steps in answering that question is being taken by the University of Tennessee physics department under an initial grant of $20,500 from Oak Ridge National Laboratory.

Part of an overall project of the Health Physics Division, the U-T research, directed by Dr. Isabel H. Tipton, U-T physicist and ORNL consultant, will determine the exact location and amount of metals normally in the body. This information is needed before scientists can find out how much radioactive metal from the air and water actually reaches various parts of the body. It will then be necessary to determine the amount of metal which causes damage.

In the U-T study a variety of metals will be looked for in normal tissues. The tissues will be studied spectrographically.

Technical Meetings

BIOLOGY SEMINAR at 3:30 p. m. Thursday, July 26, in the Conference Room, Building 9207. "Cysteine Desulfhydrase in Escherichia coli." Dr. Eugene A. Delwiche, summer participant.

CHEMISTRY SEMINAR at 3:15 p. m. Wednesday, July 25, in the Chemistry Lunchroom, Building 3550. "Some Chemical Problems in Connection With the Origin of the Earth." Prof. H. C. Urey.

OAK RIDGE PHYSICS SEMINAR at 4 p. m. Friday, July 20 (today), in the east lounge of Ridge Hall. "Elastic Properties of Materials at High Pressures and Temperatures." Prof. Darrell S. Hughes of the University of Texas, with the ORNL Physics Division for the summer.

OAK RIDGE PHYSICS SEMINAR at 4 p. m. Friday, July 27, in the east lounge of Ridge Hall. "Light Nuclei In Cosmic Rays." Prof. J. M. Jauch of the University of Iowa, with the ORNL Physics Division for the summer.

Sixty years ago this month
Taken from *The ORNL News* for July 1951

- Donald Cowen has been appointed Superintendent for newly formed Information and Reports Division. This division will embrace Central Files, Reproduction Services and Technical Publications. Mr. Cowen comes to ORNL from Fairchild Engine and Aircraft Corporation.
- Staple isotopes produced by the ORNL Isotope Research and Production Division at Y-12 has sent 24 shipments to 11 different consignees. The first and second largest shipments were 1,111 mg of Carbon 12 to General Electric at Hanford and 1,063 mg of Lithium 6 to Los Alamos.
- Dr. Harold Urey, 1934 Nobel Prize recipient in Chemistry for his discovery of deuterium, is scheduled to speak at the Oak Ridge Forum. His topic will be the "Origin of the Earth." Urey played a significant role in the Manhattan Project, developing the gaseous diffusion method, used at the K-25 site.
- "Atomic News Briefs" mentioned German scientist Ronald Richter, who claimed he could produce fusion energy based in a lithium-deuterium nuclear reaction and deliver it in milk-bottle type/size containers. The Huemul Project, as it was called, proved to be false, since what had transpired was simply the explosion of hydrogen in an electric arc.—*prepared by ORNL History Room volunteers*

From the Lab Director

Congratulations to Budhendra Bhaduri and Sheng Dai, who were named UT-Battelle corporate fellows in recognition of their outstanding contributions to their scientific and technical fields.

Our corporate fellows are exceptionally gifted individuals who exemplify the best in science and technology. The addition of Sheng and Budhu to this esteemed group recognizes their outstanding research accomplishments and their extraordinary contributions to their respective fields.

Budhendra Bhaduri (left) and Sheng Dai (right).

Budhu, the leader of the Geographic Information Science and Technology Group at ORNL, is internationally renowned for his role in conceiving, designing and implementing novel geocomputational methods to help solve a wide variety of national and global problems in energy, environment and national security. He is also a founding member of DOE's Geospatial Science Steering Committee.

Sheng, the group leader of the Nanomaterials Chemistry Group at ORNL, researches the functionality of mesoporous oxides and carbons for real-world applications, ionic liquids for chemical separation and materials synthesis, sol-gel synthesis and molecular imprinting of inorganic materials, as well at catalysis by nanomaterials.

Congratulations also goes to the ORNL scientists and engineers who have received seven R&D 100 Awards presented by R&D Magazine.

These awards, sometimes referred to as the "Academy Awards of Science," honor the 100 most outstanding advances in technology for the year and are chosen by an expert panel of independent judges and the editors of R&D Magazine.

Isaac Mahderekal, Abdolreza Zaltash, Randall Linkous, Randall Wetherington, Ed Vineyard and Patrick Geoghegan received an R&D 100 award for their work on the NextAire Packaged Gas Heat Pump.

The seven awards bring the total number of R&D 100 awards won by ORNL researchers over the years to 164. ORNL researchers were recognized for the following technologies:

- Multiresolution Adaptive Numerical Environment for Scientific Simulations;
- Mesoporous Carbon for Capacitive Deionization Electrodes for Desalination;
- Nano-Optomechanical Hydrogen Safety Sensor Based on Nanostructured Palladium Layers;
- Self-assembled, Ferromagnetic-Insulator Nanocomposites for Ultrahigh-Density Data Storage;
- NextAire Packaged Gas Heat Pump;
- CermaClad;
- New Stainless Steel Alloy Tooling For High Temperature Presses that Form Aircraft Components.

Thom Mason

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Classic cars–old and new–at June car show

June's Club ORNL car and motorcycle show had a quad-full of participants, including this antique Chevrolet Custom Deluxe.

Thom Mason discusses his new Nissan Leaf with an interested car show attendee.