OAK RIDGE National Laboratory
Reporter
Retiree Newsletter
August/September 2012

SCIENCE

ORNL home to new battery manufacturing R&D facility

Better batteries may get to market sooner with help from a new R&D manufacturing facility at ORNL. (Photo: Jason Richards)

Future automotive batteries could cost less and pack more power because of a new manufacturing research and development facility at ORNL.

The $3 million Department of Energy facility allows for collaboration with industry and other national labs while protecting intellectual property of industrial partners. The laboratory is attracting battery manufacturers, chemical and materials suppliers, system integrators and original equipment manufacturers.

"We're able to integrate advanced material components into a complete battery, analyze how it perform and better understand how to improve it," said Claus Daniel, deputy director of ORNL's Sustainable Transportation Programs. "With this capability, we can isolate and evaluate a material or process and quantify any advantage that each would provide."

> "We're advancing the field and moving closer to creating a battery that will allow automobiles to travel longer distances on a single charge."–*Claus Daniel*

Through the nation's largest open access battery manufacturing R&D facility, American businesses could gain a competitive advantage in the global market.

"R&D facilities such as these are critical in the development of advanced battery technology that is more affordable and more durable than today's batteries," said Patrick Davis, program manager of DOE's Vehicle Technologies Program.

The facility features two chambers totaling 1,400 square feet of space along with state-of-the-art battery manufacturing equipment. One chamber allows researchers to maintain relative humidity levels of between 0.5 and 15 percent. This room houses equipment that allows for mixing of various slurries, stabilization, coating and drying.

The second chamber provides a dew point of minus-40 degrees Celsius, which translates to a relative humidity of 0.5 percent. This is necessary to prevent moisture from entering and degrading battery cells. In this chamber, electrodes, cathodes and anodes are assembled automatically into pouches that are filled with a precise amount of electrolyte. The pouches are then trimmed and sealed through a heating and vacuum process.

Researchers can make batteries with up to 7 ampere-hours capacity, a size that provides good demonstration capability but requires less material, reducing the burden on smaller companies that lack large-scale production capacity.

Working with others, Daniel looks forward to many successes.

"ORNL's combination of equipment and expertise allows collaborators to develop and optimize processes, manufacturing schemes, perform diagnostics and maximize yield," Daniel said. "Working with industry, we're advancing the field and moving closer to creating a battery that will allow automobiles to travel longer distances on a single charge."

ORNL has a dozen contracts with eight battery-related companies in their quest to compete in a global marketplace.—*Ron Walli*

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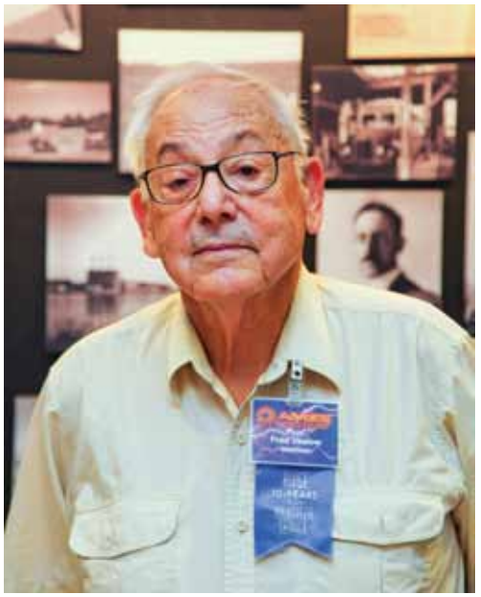
Fred Vaslow stretches 70 years of science history



AMSE volunteer Fred Vaslow can draw upon his personal experience to talk about the Manhattan Project and science in Oak Ridge. (Photo: Jason Richards)

From the early days of the Manhattan Project to answering questions at the American Museum of Science and Energy's information desk 70 years later, Fred Vaslow can talk about science and its longtime connection to Oak Ridge.

Fred, who turns 93 on Nov. 17, has worked as an AMSE volunteer for almost 30 years. Three decades is a career for some people, but they represent just a segment of what Fred has witnessed during his adult life.

"I get a lot of your general questions as to where the restrooms are and where the water fountains are located, but once in a while I'll get a science question," Fred said one Monday afternoon while working the information desk. "I always enjoy it when I get the science questions because I can talk about the work that has gone on at Oak Ridge all these years and how that connects to what is happening today. Having worked in both biology and chemistry here for a long time, I can provide some perspective."

> "We lived in many different places, but Oak Ridge was the ideal place to retire."

Having the ability to talk about science in Oak Ridge is an understatement as Fred has experienced much of the science that has accumulated at ORNL over the past 69 years.

During the early Manhattan Project days, Fred's efforts were focused in Chicago and Ames, Iowa. Later, this University of Chicago graduate was assigned to Los Alamos to work in plutonium research. Fred is one of a very few people still around to have witnessed the Trinity test explosion on July 16, 1945.

"A bunch of us were sent into different areas of the mountains to view the detonation from a distance," Fred said. "Two small rockets were set off as a signal before the actual explosion. When the detonation occurred, it was a small orange glow at first that became large very quickly. Next you heard what sounded like a loud clap of thunder as the cloud grew even larger. You knew this was something that hadn't occurred before."

From his Manhattan Project experience, Fred moved to Oak Ridge in 1946 when the X-10 Plant was diversifying its science portfolio and he could do some cutting-edge research in the areas of biology and chemistry. His first ORNL stint at ORNL ended in 1952 before he went to work in Denmark and later the University of Minnesota.

Fred was back at ORNL in 1957 to work another stint that would last until 1973. Much of his work during the second stay centered on chemical separation processes. Fred moved on to Argonne and Brookhaven national laboratories before retiring and returning to Oak Ridge.

Even though Fred and his wife, Aase – who is 88 – moved from Oak Ridge in 1973, they retained ownership of their home and were happy to come back to retire 11 years later.

"We lived in many different places, but Oak Ridge was the ideal place to retire," Fred says. "It was our third time here, but this is where was wanted to settle into retirement."

Volunteering at AMSE seemed natural to Fred, who possesses strong communications skills that have related to the public at AMSE for three decades.

Lissa Clarke of the American Museum of Science and Energy says Fred has a wide perspective in communicating with the public not only about science, but other subjects, as well.

"Fred has an outgoing personality that people respond to," Lissa says. "He certainly experienced a lot of history and he can relate that history as if it just happened yesterday in a way that everyone can understand. We're fortunate to still have that perspective."

—Fred Strohl

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August

45 years: Jim N. Treadwell, Computational Sciences & Engineering

40 years: Sherry B. Wright, Environmental Sciences

35 years: D. Michael Turpin, John M. Wheeler, Fern E. Stooksbury, Information Technology Services; **Wayne W. Manges,** Measurement Science & Systems Engineering; **Paul Thomas Singley,** Global Nuclear Security Technology; **David L. Greene, Kathi H. Vaughan,** Energy & Transportation Science; **Carlton P. Rose,** Logistical Services; **Fred J. Peretz,** Fuel Cycle & Isotopes

25 years: Robert N. Baugh, Utilities; **Sandra B. Presley,** Accounting; **D. Allen White,** Human Resources Dir.; **Mark A. Klein, Kay J. Houser,** Logistical Services; **Debra H. Austin,** Nuclear & Radiological Protection

20 years: Daniel Lane Pinkston, Steve Norris Hammonds, Kevin Arthur Smith, Research Reactors; **Michael L. Simpson,** Center for Nanophase Materials Sciences; **Mark S. Gallaher,** Accounting; **Kitty McCracken, Tracy M. Clem,** Environmental Sciences; **Amy L. King,** International Security & Analysis Programs; **Sean Russell,** Logistical Services; **Beth Bailey,** Biosciences; **Stan Heath,** Nuclear & Radiological Protection; **Vickie L. Lucterhand,** Health Services; **Karen A. Garrett,** Communications

September

45 years: Wayne Brooks, Fabrication, Hoisting & Rigging

40 years: Larry L. Dowdell, Laboratory Protection; **Angela Dianne Hale,** Facilities Development

35 years: Ruby J. Henderson, Tim Golden, Logistical Services; **T. J. Blasing,** Environmental Sciences; **Jama B. Hill,** US ITER Project Support; **Mark E. Baldwin,** Safety Services; **Janice D. Allgood,** Chemical Sciences; **Brian Addison Worley,** Computational Sciences & Engineering; **Taner Uckan,** Global Nuclear Security Technology; **Charles Ross Schaich,** Measurement Science & Systems Engineering

30 years: Tim S. Bigelow, Fusion Energy; **Canajoharia Moore,** Financial Management Services; **William Bruce Jatko,** Measurement Science & Systems Engineering

25 years: Eva C. Hickman, Fuel Cycle & Isotopes; **Phyllis J. Daley,** Energy & Transportation Science; **John D. Bradley,** Logistical Services; **Steven Laurence Laman,** Facilities Development; **Roberta D. Humphrey,** Information Technology Services; **Chong Long Fu,** Materials Science and Technology; **Anthony F. Turhollow Jr.,** Environmental Sciences

20 years: Jess C. Gehin, Don Mueller, Reactor & Nuclear Systems; **Reza T. Dabestani,** Chemical Sciences; **Sheri L. Coffey,** Research Reactors; **Stan D. Wullschleger,** Environmental Sciences

RAP team walks the beat

RAP team members from Oak Ridge and Chicago participated in Super Bowl XLVI.

When the New York Giants won this year's Super Bowl in Indianapolis, some of our ORNL staff members were there. They also went to the 2011 World Series games as well as other events in the past such as the Kentucky Derby, NASCAR events, and other major sporting events. Why they were there and what do they do?

They are part of the DOE NNSA Radiological Assistance Program team that provides radiological and nuclear security support to major events. They have supported national special security events as well, such as presidential inaugurations and national political conventions.

Prompted by the Sept. 11, 2001, terrorist attacks, the 2002 Super Bowl XXXVI in New Orleans was one of the first major sporting events covered by RAP. "The security at Super Bowl XXXVI was unbelievable," says Ed Maples, Region 2 RAP contractor response coordinator. "The stadium was shut down for one-and-a-half days, and our people did sweeps to check for radiation while dogs sniffed for bombs. Then the Secret Service locked down the stadium, and no one went in or out until game day."

Maples manages the Region 2 RAP team that can swell to more than 20 expert volunteers from ORNL and the Y-12 National Security Complex when needed for certain large, public events. They deploy portable field radiation monitoring instruments, as well as generators, mobile detection and identification instruments, air samplers and decontamination equipment.

"When the team goes out for an event, these men and women work 12 or more hours a day. They give up their weekends and holidays. There's the potential to be in harm's way in every event we cover. I'm very grateful that these people are willing to volunteer their time to protect our national security," Maples says.

RAP has protected public health and safety since the late 1950s, when it was established to provide expert help if a radiological emergency occurred. Managed by the National Nuclear Security Administration, RAP is divided into nine U.S. regions. Y-12 manages the Oak Ridge, Tenn.–based Region 2 team, which area of responsibility includes: Arkansas, Kentucky, Louisiana, Mississippi, Missouri, Tennessee, Virginia, West Virginia, Puerto Rico and the U.S. Virgin Islands.

Health physics professionals from Y-12 and Oak Ridge National Laboratory are part of the teams that deploy to conduct radiological searches and monitoring and assessment activities in coordination with emergency response from state, local and federal agencies. The ORNL RAP team members consist of personnel from the Nuclear & Radiological Protection Division and the Laboratory Protection Division.

Before 9/11, responses tended to be lost radiation sources or a transportation accident involving radiological material. After 9/11, though, RAP's primary mission shifted to searching for improvised nuclear devices and radiological dispersal devices. Maples' office went from one full-time employee to three employees and from a $350,000 budget to $1.4 million.

Their busiest year was 2002, when the team was deployed for 601 person days. In 2010 the team was deployed for 424 person days. The RAP team has supported other NSSEs such as national debates, G8 conferences, and other Special Events (less massive than the NSSEs) including World Equestrian Games, Central American and Caribbean Games, other Super Bowls and Major League Baseball All-Star Games.

—Story courtesy of ORNL's Roger Davis, who is a member of the RAP team

> "I'm very grateful that these people are willing to volunteer their time to protect our national security."–*Ed Maples*

Purple traps yield ORR's first emerald ash borers

ORNL intern Jordan Chaney inspects an emerald ash borer trap near Bethel Valley Road. Jordan is an undergrad in forestry, wildlife and fisheries at the University of Tennessee.

The emerald ash borer has been found on the Oak Ridge Reservation. On May 10 a trap on Highway 95 at the Highway 58 interchange produced the first instance of the destructive non-native insect in Roane County. Five days later, a second trap on Bethel Valley Road near the East Portal turned up the first capture in Anderson County.

Unfortunately, these finds signal the beginning of a decline of ash species throughout the reservation" says Greg Byrd, forester with the ORNL Natural Resources Program. "Dieback will become more prominent as the insect populations expand. Native ash trees have little defense against this pest, which was transported from Asia a little over ten years ago — probably within wood shipping materials. There are control measures against EAB for high value individual trees if the dieback hasn't reached the tipping point, but on a forest scale, no controls have yet been found to be practical."

Greg says the Natural Resources Program will develop recommendations for dealing with the ash borer impact at the campus level. One of the projects for ORNL interns this summer will be to identify host trees within the high-use areas. "We'll examine how our ash trees matrix with the four 'P's': power, parking, pedestrians and picnic tables."

Campers from infested areas who unwittingly bring infested wood from home have allowed the pest to leapfrog quarantined areas and become established in new areas. Researchers believe adult borers would migrate only up to a mile from their hatching point without help from people. So one of the most important messages foresters have been passing along is the need to observe the state's new regulations restricting the movement of hardwood firewood within our area.

Retirees can participate in United Way giving option

ORNL has set the standard for DOE national laboratories, exceeding millions of dollars over recent years in combined employee and corporate giving to the United Way in 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 says.

The "payroll deduction" option is available to you as a retiree, and any changes will be reflected in your 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 2012 campaign.

"On behalf of the entire United Way effort at ORNL, thank you in advance for your support," Lewis says.

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

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.

Aug. 11	Whitewater Rafting Trip
Aug. 30	The Foreigner at Oak Ridge Playhouse
Aug. 31	Backwards in High Heels
Sept. 8	UT vs. Georgia State Football Game
Sept. 15-16	Fall Creek Falls Overnight
Sept. 22	UT vs. Akron Football Game
Sept. 28-29	Townsend Overnight

THE NEWS
OAK RIDGE NATIONAL LABORATORY

A Publication by and for the ORNL Employees of Carbide and Carbon Chemicals Company, Union Carbide and Carbon Corporation

Vol 5—No. 3 OAK RIDGE, TENNESSEE Friday, August 1, 1952

THEIR'N—The family of Mrs. Robert B. MacDonald, Industrial Relations, is extremely proud of its "place in the country," described in the accompanying article. At top left, Mrs. Mac is shown with Big Mac and Young Mac pointing proudly at the signpost in their front yard that leaves no doubt as to whose estate it is. Top right, the senior MacDonalds check up on the welfare of some of the turkeys they raise (among many other things!), and, lower left, Young Mac displays one of the plump bunnies that livestock investment. At the bottom right, Big Mac gives Bankrupt, the tism of camera. For further details of this amazing household, see the

Availability of Polonium-210 Reported By AEC on Eve of Sixth Anniversary

First Reactor-Produced Isotope Used as Alpha And High-Energy-Neutron Source for Research

Tomorrow, August 2, marks the sixth anniversary of the shipment of the first radioactive isotope from Oak Ridge National Laboratory. The shipment, one millicurie of radiocarbon-14, went to the Barnard Skin and Cancer Hospital, St. Louis, Mo.

A six-year report on the eve of the anniversary shows that ORNL has made more than 35,000 shipments since August 2, 1946, to users in 46 states and 33 foreign countries. According to the report, kilocurie shipments are not uncommon today.

And almost coinciding with the anniversary is the announcement made today by the Atomic Energy Commission that reactor-produced polonium-210 may now be purchased at Oak Ridge for research activities. Polonium is the first reactor-produced radioisotope to be sold which emits alpha particles. It can be used also as a source of high-energy neutrons.

The polonium announcement was made by the Isotopes Division, a part of the AEC's Oak Ridge Operations, and the licensing agency for purchases of significant quantities of radioactive materials. The announcement stated that the newly available polonium is needed by research groups for physical and biological investigations. It may be used also in oil-well logging and for ionization

U-T is Studying Metal Content of Bones and Tissues

Although the metal in a body is worth less than a dollar, even at today's inflated prices, the University of Tennessee physics department has received a major contract to continue research designed to find, identify, and measure metallic elements in tissue and bone.

Oak Ridge National Laboratory is supporting the study because it is a step toward solving the problem of how much radioactive metal is "permissible" in air and water before the percentage becomes dangerous to those who use radioactive isotopes.

Directed by Dr. Isabel H. Tipton, the U-T research team has spent the past year

ORNL Woman Leads Hectic, Happy Life As the Strawboss of 'MacDonald's Farm'

Three miles west of Eaton's Crossroads on Highway 70 there are two buildings on the highway proper that must have fascinated thousands of travelers in the past several years. One building carries a neat sign saying "His'n"; the other is correspondingly labeled "Her'n"; right between the two is a sign reading "MacDonald's Farm." And curious ORNL people who'd like to know more about the place are in a much better position to obtain information than the poor tourists and general passersby who will **never** know, because the distaff side of the MacDonald organization, Mrs. Robert MacDonald, is a member of the ORNL Industrial Relations Division, and consequently able to clear up any questions in short order.

The "His'n" and "Her'n" setup, for one thing, is not a symbol of a divided household, as some people not in the know have suggested. The MacDonald household proper is the building labeled "Her'n"; however, some time ago Mr. MacDonald erected the other building for use as a workshop, and posted the two signs as notification of whose domain is whose in the MacDonald realm. Nowadays part of the workshop is serving as a temporary chicken house, but that doesn't stop the head of the clan, Big Mac, from hobbying away.

This hobbying and livestock proposition is a big deal in the MacDonald menage, which, besides Mrs. Mac and Big Mac, includes Young Mac (Robert, Jr.) and Grandma Mac. Young Mac, 16, is a senior at Lenoir City High School this fall, and Grandma Mac is visiting from New York. They're all involved with farm affairs that keep them on the jump most of their spare time, but this doesn't prevent their leading healthy and happy lives.

The farm started with the purchase of three hens, destined actually for the family larder, but inasmuch as the three biddies started running up big production records in the egg-laying line, they've kept their heads, and now the MacDonald's have chickens like some people have bees. They also maintain flocks of turkeys, pheasants, and

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Sixty years ago this month

Taken from *The ORNL News* for August 1952

- August 2, 1952 marked the sixth anniversary of the shipment of the first radioactive isotope, one millicurie of radiocarbon-14, from ORNL to the Barnard Skin and Cancer Hospital in St. Louis. The demand for isotopes for commercial and general research uses spiraled during the program's first six years, with the largest selling isotopes being iodine-131, phosphorus-32 and cobalt-60.
- Two ORNL scientists, Drs. George Boyd, Chemistry Division and Alan Conger, Biology Division were named recipients of Fulbright Scholarships. Dr. Boyd's work was associated with the physical chemistry of the X ion exchangers. Dr. Conger, a geneticist, conducted radio therapeutic research.
- ORNL, with the concurrence of the AEC, employed a technique known as "neutron activation analysis" as a new method of measuring with atomic energy. The technique allowed measurement of very minute quantities of impurities in drugs, pharmaceuticals, foods, metals, lubricant, plastics, and fertilizers more accurately than ever before. —*prepared by ORNL History Room volunteers*

From the Lab Director

Congratulations to the ORNL scientists and engineers who have received 2012 R&D 100 awards. Nine ORNL innovations have been presented with the honors from R&D Magazine, tying an internal record for largest number of awards in a given year and bringing ORNL's "lifetime" total to 173. The winners are:

- Nano-Super Hard Inexpensive Laser Deposited (NanoSHIELD) Coatings,
- RCSim (Radio Channel Simulator) Software,
- HiCap Adsorbents,
- Low-Cost, Lightweight Robotic Hand Based on Additive Manufacturing,
- Asymmetric Rolling Mill: A Novel Route for Processing Sheet and Plate,
- Low-Cost Plasma Processing System for Research and Pilot Production (LFRF-501),
- Broadband Micromechanical Antenna,
- Wavelength-shifting scintillator neutron detector (WLS detector),
- Highest Pinning Force, High-Temperature Superconducting Wires with Double-Perovskite Tantalate Nano-Pinning Centers.

I would also like to congratulate Materials S&T Division's Zhili Feng, who was elected to the American Welding Society's 2012 class of fellows. Zhili leads the lab's Materials Joining group. The AWS recognized his outstanding contributions in several important areas such as computational welding mechanics, friction-stir welding and processing, characterization of weld by advanced neutron and synchrotron scattering and novel solid-state joining processes of dissimilar metals.

We were honored to host Lady Vols coach Holly Warlick this June to kick off the 2012 ORNL United Way campaign. Coach Warlick spoke about the benefits of teamwork and how United Way can benefit from the collective assistance of ORNL employees. This year's efforts, led by campaign chair Hurtis Hodges and co-chair Becky Verastegui, are focused on increasing the number of staff members who contribute through payroll deduction.

I recently visited Camp Buck Toms near Rockwood, Tenn. to present the Boy Scouts of America's Great Smoky Mountain Council with the first installment of a $150,000 gift from UT-Battelle for the ongoing campaign to renovate the camp. This corporate gift will help the local Scouting organization establish quality STEM (science, technology, engineering and mathematics) learning activities for the hundreds of Boy Scouts in our community who attend Camp Buck Toms.

Thom Mason

Lady Vols coach Holly Warlick helped kick off ORNL's 2012 United Way campaign. (Photo: Jason Richards)

From left, Joey Matthews of Boy Scouts of America's Great Smoky Mountain Council, ORNL's Trent Nichols and Casey Norwood of Boy Scouts of America's Great Smoky Mountain Council joined Thom during a July visit to Camp Buck Toms.

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Lab's summer visitors include roaming bear

One less bear roams the Oak Ridge Reservation. Tennessee Wildlife Resources Agency officers lured a black bear into a cage trap at the High Flux Isotope Reactor's maintenance facility early Friday morning, June 1.

The bear was spotted crossing Melton Valley Road near the Molten Salt Reactor Experiment the day before, and had left evidence (i.e., ripped up trash bags) of having been at the HFIR facility, which is surrounded by woods. Bears had also been reported near Y-12 and Bear Creek Road during the previous week.

Wildlife management coordinator Neil Giffen estimated the bear as two or three years old, or a "subadult." The black bear was transported to the TWRA North Cumberland Wildlife Management Area in Scott County, "where there is an existing black bear population," Neil says.

A young black bear was trapped by TWRA officials near ORNL's HFIR and moved to a wildlife management area in Scott County. (Photo: Jason Richards)