



Tuan Vo-Dinh's scientific quest for truth. See page 2.



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Research Highlights . . .

Pass the purslane?

Rabbits might have the right idea after all when it comes to diet, a study by scientists at DOE's Oak Ridge National Laboratory and a Venezuelan university concludes. The study found that purslane, a weed common in warm climates, was effective in lowering cholesterol levels in rabbits. Taken as a diet supplement, it may do the same in humans. The researchers found that purslane grown in shady conditions increased the concentration of omega 3 fatty acids, which have been shown to reduce cholesterol. Purslane grown in shade was also lower in saturated fatty acids, which can increase cholesterol.

[Ron Walli, 423/576-0226, wallira@ornl.gov]

Automated systems to detect nuclear explosions worldwide

Two devices developed at DOE's Pacific Northwest National Laboratory will be used worldwide to gather scientific evidence of nuclear detonations. The two systems can detect explosions by analyzing the atmosphere for traces of radioactive material. These systems represent a leap beyond existing monitoring devices with their greater sensitivity, full automation, near real-time reporting and novel nuclear radiation detectors. The devices, known by their acronyms ARSA and RASA, will be part of an international monitoring system that is being established to watch and listen for evidence that nuclear weapons are being tested. ARSA and RASA will comprise a large part of the technology employed in the worldwide 80-station radionuclide network.

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A different kind of summer camp

There's no hiking along trails flanked by lush woods, no swimming in a lake, and no singing by the campfire. This summer, the Princeton Plasma Physics Laboratory (PPPL) hosted a different kind of camp—"Plasma Camp"—a two-week summer program for high school physics teachers. Through the program, officially called the Plasma Science and Fusion Energy Institute, 10 teachers from across the nation traded hikes for lectures about fusion, swimming for experiments with plasmas (a hot, ionized gas), and campfire harmony for curriculum planning. The goal is to help teachers develop curricular materials for introductory physics teaching, making ideas in plasma and fusion engaging to high school students.

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Biodiesel gets a boost

Two new studies conducted at DOE's National Renewable Energy Laboratory highlight the benefits of **biodiesel** in reducing air pollution and dependence on imported oil. *An Overview of Biodiesel and Petroleum Diesel Life Cycles* concludes that the use of 100 percent biodiesel reduces carbon dioxide emissions by more than 75 percent over petroleum diesel. *Biodiesel Research Progress, 1992-1997* is a compendium and summary of biodiesel research projects conducted in the U.S. during the past five years. A third study, *A Look Back at the U.S. Department of Energy's Aquatic Species Program: Biodiesel from Algae*, summarizes 18 years of microalgae research for biodiesel production.

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DOE Pulse highlights work being done at the Department of Energy's national laboratories. DOE's laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. *DOE Pulse* (www.ornl.gov/news/pulse/) is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).

First particle collisions thanks to three-lab collaboration

Under Secretary of Energy Ernest Moniz had reason to be happy with three DOE laboratories, especially SLAC's B Factory team. Particle collisions occurred in July, on time and on budget, thanks to the cooperative efforts of SLAC, LBNL and LLNL.

"This is a truly impressive accomplishment so early in the commissioning process," he said. "The B Factory will help us examine one of Nature's great secrets—why the universe has such a preponderance of matter over antimatter."

Funded by \$177 million from the U.S. Department of Energy, the Asymmetric B Factory was a joint construction project that began in 1994. The collider is now in the commissioning process that will continue into the spring of 1999.

Physicists circulated beams of electrons and their antimatter opposites, known as positrons, simultaneously in two evacuated rings, each more than a mile around. When they brought the narrow beams together at a single crossing point, they observed the deflection and disruption of one beam by the other—a sure sign that head-on collisions had occurred.

The Asymmetric B Factory is the world's first particle collider in which the electrons and positrons meet at unequal energies: electrons have almost three times the energy of positrons. Because of this difference, plus the need to circulate high currents in order to produce millions of B mesons, physicists have designed a machine with the two different kinds of particles traveling in two separate rings. A complex array of magnets before and after the crossover point brings the beams together and then separates them after they clash.

"I am very pleased that we have achieved collisions so soon after finishing construction," said SLAC physicist Jonathan Dorfan. "We look forward with great anticipation to completing the commissioning process and beginning the physics program next year."

Submitted by DOE's Stanford Linear Accelerator Center

"Science and technology underpin all of the work that is done at the Department. For that reason, the Department must particularly work to coordinate the mission of its national laboratories—our national treasures. Our nation's technological future lies within these supercomputing is world-renowned. From Nobel prizes to R&D 100 Awards, the Department is consistently recognized and rewarded by the highest echelons of the scientific community. The continued development of the capabilities and capacities of the Department's laboratories is of critical importance to the United States."

Bill Richardson, on his confirmation as Secretary of Energy

SEARCH FOR TRUTH SPURS ORNL RESEARCHER

Like philosophy and art, science is a means to the ultimate truth for researcher Tuan Vo-Dinh of DOE's Oak Ridge National Laboratory.

That quest for truth has led to five R&D 100 Awards, a DOE Biological and Environmental Research 50 Award and numerous other honors for Vietnam native Vo-Dinh. Since he joined ORNL in 1977, the underlying theme of his research reflects part of DOE's mission: the development of technologies to protect human health and the environment.

Among his recent inventions (he has 15 patents) are the DNA Biochip, the Luminoscope and the optical biopsy. The biochip is a miniature device that integrates microelectro-optical probes—such as DNA and antibodies—for rapid medical diagnosis. The Luminoscope is a portable instrument that detects, measures and monitors levels of gasoline, oil, polychlorinated biphenyls and pesticides in soil or in water. The optical biopsy uses light to diagnose certain forms of cancer in the esophagus, colon, cervix, lungs and bladder. Diagnosis is made almost instantly and painlessly without the need of tissue biopsy.

Vo-Dinh delights in knowing that he and colleagues at ORNL and around the world are making a difference in people's lives and in the environment.

"Through the development of these environmental and biomedical technologies, we have a chance to affect people's lives—and to perhaps give them a greater appreciation for life," he said. An appreciation of the environment is a prime motivator for Vo-Dinh, who sees science-driven technologies as essential to global responsibility. Along the way, the search for knowledge helps people discover something about themselves and the truths that govern nature.

"My work is really about the human quest for the ideal form of truth," said Vo-Dinh.

Submitted by DOE's Oak Ridge National Laboratory