# SCIENCE

**Publisher:** Richard S. Nicholson
**Editor-in-Chief:** Daniel E. Koshland, Jr.
**Editor:** Ellis Rubinstein
**Managing Editor:** Monica M. Bradford
**Deputy Editors:** Philip H. Abelson *(Engineering and Applied Sciences);* John I. Brauman *(Physical Sciences);* Thomas R. Cech *(Biological Sciences)*

**Editorial Staff**

**Assistant Managing Editor:** Dawn Bennett
**Senior Editors:** Eleanore Butz, R. Brooks Hanson, Barbara Jasny, Katrina L. Kelner, David Lindley, Linda J. Miller, Phillip D. Szuromi, David F. Voss
**Associate Editors:** Gilbert J. Chin, Pamela J. Hines, Paula A. Kiberstis, Suki Parks, L. Bryan Ray
**Letters:** Christine Gilbert, *Editor;* Steven S. Lapham
**Book Reviews:** Katherine Livingston, *Editor;* Annette Theuring, *Assistant Editor;* Susan Randolph, *Editorial Assistant*
**Contributing Editor:** Lawrence I. Grossman
**Editing:** Lois Schmitt, Valerie Jablow, *Senior Copy Editors;* Douglas B. Casey, Harry Jach, Erik G. Morris, Christine M. Pearce
**Copy Desk:** Ellen E. Murphy, *Supervisor;* Joi S. Granger, Beverly Shields, Melissa M. Quackenbos, Kameaka Williams, *Assistant*
**Editorial Support:** Sherryf Farmer, *Supervisor;* Linda Dienavs, Carolyn Kyle, Michele Listisard, Diane Long, Jennifer Mattson, Patricia M. Moore
**Administrative Support:** Sylvia Kihara, Charlene King, Jeanette Prastein
**Telephone:** 202-326-6501; **FAX:** 202-289-7562; **TDD:** 202-408-7770

**News Staff**

**News Editor:** Colin Norman
**Features Editor:** John M. Benditt
**Deputy News Editors:** Tim Appenzeller, Joshua Fischman, Jean Marx, Jeffrey Mervis
**News & Comment/Research News Writers:** Ivan Amato, Christopher Anderson, Faye Flam, Troy Gately, *copy,* Constance Holden, Richard A. Kerr, Eliot Marshall, Richard Stone, Karen Fox, *Intern*
**U.S. Bureaus:** Marcia Barinaga (Berkeley), Jon Cohen (San Diego), Anne Simon Moffat (Chicago), John Travis (Boston)
**Contributing Correspondents:** Joseph Alper, Barry A. Cipra, Robert Crease, Elizabeth Culotta, Ann Gibbons, Virginia Morell, Robert Pool, Leslie Roberts, Gary Taubes, M. Mitchell Waldrop
**Administrative Support:** Fannie Groom, Jennifer Hodgin
**Telephone:** 202-326-6500; **FAX:** 202-371-9227

**Art & Production Staff**

**Production:** James Landry, *Director;* Wendy K. Shank, *Manager;* Lizabeth A. Harman, *Assistant Manager;* Laura A. Creveling, Scherraine B. Mack, Linda C. Owens, *Associates*
**Art:** Amy Decker Henry, *Director;* C. Faber Smith, *Associate Director;* Katharine Sutliff, *Scientific Illustrator;* Holly Bishop, *Graphics Associate;* Elizabeth Carroll, *Graphics Assistant,* Leslie Blizard, *Assistant*

**Europe Office**

**Senior Editor:** Richard B. Gallagher
**Associate Editor:** Jeffrey Williams
**News Editor:** Daniel Clery
**Correspondent:** Peter Aldhous
**Editorial Associate:** Belinda Holden
**Business Manager:** Julie Eastland
**Address:** Thomas House, George IV Street, Cambridge, UK CB2 1HH
**Telephone:** (44) 0223 302067; **FAX:** (44) 0223 302068




# EDITORIAL

## A Multipurpose National Laboratory

At a time of turbulence in science policy, it may be useful to consider the activities of some of the major federal organizations conducting research and development (R&D). One of these is the Oak Ridge National Laboratory (ORNL). Many of its programs relate to the development of technologies for efficient production and use of energy. Other projects relate to global competitiveness, climate change, and environmental cleanup.* The ORNL is oriented toward applications. Often projects are carried out by multidisciplinary teams. Basic research is conducted, much of it motivated by efforts to reach practical goals.

The total budget of the ORNL is about $500 million. Funds to support the laboratory come mainly from various divisions of the Department of Energy (DOE). Other federal agencies contribute, especially the Department of Defense. There is a growing involvement by industry. Some individual investigators obtain funds from wherever they can be obtained, including the National Science Foundation and the National Institutes of Health.

Employees of the ORNL number about 5000, of whom 30% have technical degrees, including 900 with the Ph.D. The laboratory is host each year to 30,000 visitors, 4400 of whom spend 2 weeks or more there. These guest scientists and engineers, one-third from industry, constitute a reinforcement of staff by a total of 1500 full-time equivalents and are key elements in technology transfer.

At the ORNL are 10 major user facilities that include a High Temperature Materials Laboratory, a Surface Modification and Characterization Collaborative Research Center, and a Bioprocessing Research Facility. Access to the facilities is possible for qualified investigators from universities, industry, and other laboratories. Permission is granted on the basis of scientific merit, technical feasibility, and the compatibility of the proposed research with the facility's equipment. Most of the research results are published in the open literature. However, proprietary research can be conducted, and the ORNL now participates in more than 50 cooperative R&D agreements, or CRADAs, which allow industry to work closely with ORNL experts and equipment. Major companies are involved.

The visitors come to obtain knowledge. They are also attracted to the special facilities. For example, research on and development of high-temperature materials have been notably successful, leading to discovery of useful aluminides and tough ceramics. These have good potential for improving the efficiencies of heat engines. Equipment for research is much superior in quantity and quality to that of most universities and companies.

Another example of resources of the ORNL is competence in creating specialized equipment. Capabilities in computation, engineering design, machining, and electronics have enabled it to produce complicated robotic devices. This capability was attractive to the Department of the Army. The ORNL produced for it prototypes of a robotic munitions transferring machine and a robot for detection and disposal of land mines. Robots for discovery and cleanup of hazardous wastes have also been produced.

Diverse R&D projects number in the hundreds. They include high-efficiency heat pumps; insulation research; renewable energy from improved yields of biomass; bioprocessing of waste paper; changing the properties of surfaces by ion bombardment; crystallography using slow neutron beams; portable, highly sensitive analytical devices for contaminant volatile organic chemicals; bioremediation in the rhizosphere; cryopreservation of *Drosophila* embryos; and mutations in mice induced by radiation and chemicals.

The Oak Ridge reservation on which the ORNL is located was the site of intense uranium-related activities during and after World War II. Production has stopped, but contamination associated with it remains. Cleanup efforts are being conducted at annual costs in the many hundreds of millions of dollars. The ORNL is participating in monitoring and furnishing new technology for the effort.

At the ORNL one encounters a can-do spirit—confidence in ability to make important contributions to the future of this country. There is an undercurrent of apprehension regarding the future of the laboratory. However, a source of optimism is the belief that Secretary O'Leary will foster use of DOE facilities to aid our nation's economic competitiveness.

**Philip H. Abelson**

*Detailed information about ORNL can be obtained from Dr. Alvin Trivelpiece, Director, Oak Ridge National Laboratory. Telephone 615-576-2900.