Winners of National Medals of Science, Technology Named

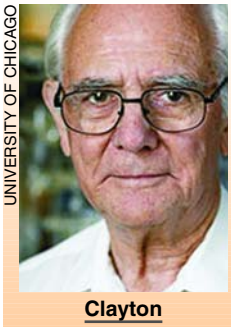
Leading scientists and others involved in research that reflects the nation's innovative spirit and helps maintain its economic competitive edge have been recognized with the 2004 National Medal of Science and the 2004 National Medal of Technology, the nation's highest honors for scientific achievement and technological innovation.

Award recipients were announced in November by President Bush and will receive their medals in a White House ceremony later this year.

The National Medal of Science, which is administered by NSF, recognizes researchers who have made major contributions in science, engineering, or mathematics during their careers. Including the winners for 2004, the award has gone to 417 scientists and engineers since it was established in 1959. Of the eight recipients in 2004, two are involved in physics-related work.

Robert N. Clayton received a medal "for his contributions to geochemistry and cosmochemistry that provided major insights into the evolution of the solar system through his discovery of non-mass-dependent isotope shifts in meteorites." He was also recognized "for being an exemplary role model as a mentor, teacher and advocate for rigorous science." Clayton is Enrico Fermi Distinguished Service Professor Emeritus at the University of Chicago.

Edwin N. Lightfoot won a medal "for his innovative research and leadership in transport phenomena focusing on biochemical and biomedical engineering with application to blood oxygenation, bioseparation techniques and diabetic responses." He is Hilldale Professor Emeritus at the University of Wisconsin, Madison.



Clayton

Lightfoot

The National Medal of Technology, bestowed by the president since 1985, was mandated by Congress in 1980 to recognize significant contributions to the nation's economic strength and standard of living. Of the two individual recipients of medals in 2004, one does physics-related work; of the five companies receiving the 2004 medals, two are involved in physics-related work.

Roger Lee Easton of RoBarCo in Canaan, New Hampshire, received the award "for extensive pioneering achievements in spacecraft tracking, navigation and timing technology that led to the development of the NAVSTAR – Global Positioning System (GPS)," according to the US Department of Commerce.


Easton

IBM's microelectronics division, based in East Fishkill, New York, is being recognized "for over four decades of innovation in semiconductor technology, including the development and introduction of the DRAM cell, copper wiring, silicon on insulator (SOI) technology, and high speed silicon germanium devices."

Motorola, Inc of Schaumburg, Illinois, is receiving a medal "for over 75 years of technological achievement and leadership in the development of innovative electronic solutions, which have enabled portable and mobile communications to become the standard across society."

Mineral Physicists Win Balzan Prize

Two Carnegie Institution researchers who have spent decades analyzing the behavior and properties of minerals exposed to extreme conditions, especially high pressure, have been jointly awarded the Balzan Prize in mineral physics by the International Balzan Foundation. Four prizes awarded annually recognize achievements in science, art, the humanities, and social sciences. Since 1961, 106 scientists, institutions, and others have received the Balzan Prize, including Mother Teresa, Jean Piaget, and the Nobel Foundation.


Hemley


Mao

Russell J. Hemley, a senior staff scientist at the institution's geophysical laboratory in Washington, DC, and director of the US Carnegie/Department of Energy Alliance Center (CDAC), and **Ho-kwang Mao**, a senior staff scientist at the institution's geophysical lab, won the award "for the impressive impact of their joint work leading to fundamental breakthroughs, theoretical and experimental, in the field of minerals submitted to extreme physical conditions," according to the foundation's citation.

The foundation said the two "have operated as a highly effective team, characterized by twenty years of research contributions at the highest level. They have developed techniques which allow them to study the behaviour of a wide range of materials, such as hydrogen, the most abundant 'mineral' in the universe. Their results have deep implications for our understanding of nature."

Although the scientists' work has focused largely on researching the properties of materials at high temperatures, they also examine materials at pressures of up to 2.5 megabars. (See PHYSICS TODAY, August 1998, page 26.)

Hemley, who began his research in molecular spectroscopy and electronic structure theory, early on became interested in the effects of pressure in such studies; at Carnegie he began to apply and extend new chemical physics techniques in high-pressure diamond anvil cell experiments, according to the institution's website. Since then, his research has expanded to include high-pressure experimental and theoretical studies in fundamental chemistry and physics, Earth and planetary science, and materials science.

Some of Hemley's recent accomplishments include the discovery of new phenomena in hydrogen at megabar pressures; the observations of new transformations in molecular materials and novel high-pressure molecular compounds; the creation of new materials under pressure, including superconductors, magnetic structures, and superhard materials; and the novel behavior of glasses and amorphous solids under pressure. Hemley continues to develop new high-pressure techniques, including optical methods, synchrotron radiation for diffraction and spectroscopy, and transport measurements.

In 1976, Mao and his colleagues were the first to create a static pressure of 1 megabar—a million times the ambient pressure at sea level and double what had previously been achieved in a laboratory. Since then, they have progressively improved the multi-megabar technique and coupled it with analytical methods, including synchrotron x-ray diffraction, infrared, Raman, Brillouin, fluorescence, and Mössbauer spectroscopies, according to the institution.

Since 1985, in collaboration with Hemley, Mao has further improved both the technique of creating such pressures and the methods of analyzing what happens to substances exposed to them, the foundation says.

Hemley and Mao have observed and described such extreme-pressure phenomena as the occurrence of new types of molecular bonds; the creation of new, extremely hard materials, superconductors, and magnetic structures; and pressure-induced crystallization and amorphization, the foundation says.

Hemley and Mao received their prize of $1 million Swiss francs (about US$800 000) during a November ceremony in Bern, Switzerland.

In Brief

Philip H. Bucksbaum has joined the faculty of Stanford University to direct the new Ultrafast Science Center, a partnership between Stanford and the US Department of Energy. Bucksbaum will also be a professor at SLAC and in Stanford's applied physics department. Through the winter term he is continuing as the Peter Franken Distinguished Professor of Physics at the University of Michigan, where he has been since 1990. Bucksbaum was named to his new post last October.

Michael L. Coats has been named director of NASA's Johnson Space Center in Houston, replacing **Jefferson D. Howell Jr**, who is on assignment as a visiting professor to the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin. A former astronaut, Coats began his new position last November and is responsible for overseeing the center, which is NASA's primary operations center for space flight. Coats is the ninth director in Johnson's 44-year history. He had been vice president of Lockheed Martin Astronautics in Denver.

The American Association of Physics Teachers in College Park, Maryland, has named **Charles H. Holbrow** its senior staff physicist, a new position for the society. Holbrow is Charles A. Dana Professor of Physics Emeritus at Colgate University in Hamilton, New York, a visiting physics professor at MIT, and a visiting associate at Harvard University's physics department. He began last October at his AAPT post, in which he is developing programs to help make the society more useful to college and university physics faculty.

Ohio University in Athens, Ohio, has hired **Madappa Prakash** as a physics professor. As part of his new position, Prakash is also a member of the university's Institute of Nuclear and Particle Physics and is contributing to a newly funded joint research initiative between nuclear physics and astrophysics. Prior to beginning at his post in September 2005, Prakash was a research professor at Stony Brook University in Stony Brook, New York.

William M. Yen, Graham Perdue Professor of Physics at the University of Georgia in Athens, has been selected as winner of the ICL Prize for Luminescence Research and will receive the international award at July ceremonies in Beijing. The honor from the International Conference on Luminescence is being given for Yen's "pioneering discoveries in the dynamics of solid state optical processes and for exceptional leadership in the field of luminescence." The prize was established in 1984 and is awarded in conjunction with the tri-annual International Conference on Luminescence. Yen will receive a plaque and C2000 (about $2500).

Obituaries

Alastair Graham Walter Cameron

Alastair Graham Walter Cameron, one of the key discoverers of stellar nucleosynthesis and a founder of modern nuclear astrophysics, died of a heart attack in Tucson, Arizona, on 3 October 2005.

Al was born in Winnipeg, Canada, on 21 June 1925. Son of a biochemistry professor at the University of Manitoba, Al was raised in an environment in which scholarly and professional work was valued. At the age of four, he addressed all men as "Doctor" in an early attempt to form a general hypothesis from limited data. He excelled in science and math and was entranced by the notion of space travel. He did his graduate work in nuclear physics under Leon Katz at the University of Saskatchewan, and in 1952 received the first physics PhD there. The deep knowledge he developed of both experimental and theoretical nuclear physics proved a key to the creative work he would later undertake.

A report that Paul Merrill had discovered technetium in a red-giant star intrigued Al because of the neutrons required to produce Tc—which has only radioactive isotopes—and turned Al's attention to problems in astronomy, the source of neutrons in stars, and thermonuclear reaction rates. Looking for a place where he could pursue his new interests, he joined the Chalk River Laboratories of the Canadian Atomic Energy Commission.

By the early 1950s, mechanisms for producing the elements were a major focus of interest. The specific energy-producing nuclear reactions in stars had been shown earlier by Hans Bethe and Edwin Salpeter. Efforts by George Gamow, Ralph Alpher, and Robert Herman to explain cosmic

PHYSICS TODAY is changing the way it publishes obituaries. Some will continue to appear in print, but most will be available only online (see PHYSICS TODAY, October 2005, page 10). Subscribers can visit http://www.physicstoday.org/obits to notify the community about a colleague's death and submit obituaries up to 750 words, comments, or reminiscences. Each month, recently posted material will be summarized here, in print. Select online obituaries will later appear in print.