



Lawrence Awards for contributions to atomic energy were given by Energy Secretary Donald Hodel (top row center) to (counterclockwise from top left) Mitchell J. Feigenbaum, George Chapline Jr, Nicholas Turro, Michael J. Lineberry and Raymond E. Wildung.

power, while properties of the core are measured and tested. Such measurements, and their mathematical extension to full-scale operation, are used to predict breeder-reactor behavior and to validate breeder designs. For example, one heterogeneous-core critical experiment, constructed as part of this program, now serves as the reference core for the Clinch River Breeder Reactor Project.

After receiving his PhD in engineering science and physics from the California Institute of Technology in 1972, Lineberry joined the staff at Argonne, where he is now associate director of the Applied Physics Division.

Turro was honored by DOE "for his pioneering work in mechanisms of organic photochemistry, reactions of energy-rich compounds and for the extension of his study of the chemistry and physics of excited states to systems with restricted geometries, such as micelles."

Turro's work in photochemical research has increased our understanding of chemical energy-transfer processes, the thermal decomposition of energetically rich molecules, and the mechanisms by which polymeric materials and their environments control chemical behavior. For example, in his work on the photolysis of molecules in micellar solutions—that is, solutions of soap-like molecules in which the molecules form small globules—he used his knowledge of molecular magnetic interactions and the restricted geometry of the micelle environment, to separate C^{12} and C^{13} isotopes efficiently.

He received his PhD in chemistry from the California Institute of Technology in 1963, and then spent a year at Harvard University as a postdoctoral fellow before coming to Columbia University, where he is now Schweitzer Professor of Chemistry.

DOE selected Wildung "for his significant contributions to the field of ecology in understanding the transport of

pollutants through the soil into plants and animals, the carbon cycle of soils, the chemical and nutrient processes in lakes and the role of organic complexes on the availability of plutonium."

His work on the role of soil chemical and microbial processes in soil transport and the uptake of radionuclides has led both to an increased understanding of the mechanisms for plutonium transport in the environment, and to a more realistic basis for estimating health risks due to plutonium. Recently the results of his work have been used to extend our understanding of similar transport mechanisms for other pollutants, such as solid wastes.

Wildung obtained his PhD in soil science from the University of Wisconsin in 1966 and spent one year doing postdoctoral work there before joining the staff of the Pacific Northwest Laboratory, where he is now associate manager for environmental sciences. He has also played an active role as an adviser, both nationally and internationally, on the environmental effects of energy development.

Reagan presents National Medals to four physicists

President Reagan, on hand to present the National Medals of Science to 12 Americans, called it a "privilege" to play a part in honoring those "who've made outstanding contributions to our way of life through science and engineering." The President found it particularly appropriate that we recognize these contributions "at a time when our technological leadership is being challenged from abroad."

"In the past, too many Americans tended to take our preeminence in science and engineering for granted. We must never forget that what we enjoy now is the result of superior professionals like those we are honoring," the President said, urging young

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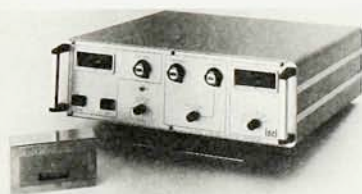
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people to use them as an example. "We as a nation cannot rest on our laurels in this vital area of concern, and American young people need to know that their well-being depends on our continued progress in science and technology," he said.

Among the twelve winners this year are four physicists—Philip W. Anderson, of Princeton University and Bell Labs; Yoichiro Nambu, of the Enrico Fermi Institute at the University of Chicago; Edward Teller, of the Hoover Institution on War, Revolution and Peace at Stanford University; and Charles H. Townes, of the University of California, Berkeley.

Anderson was cited "for his fundamental and comprehensive contributions to the theoretical understanding of condensed matter, most notably his work on electron localization in highly disordered solids and the nature of localized magnetic states in metals."

Nambu was recognized "for his se-

minal contributions to the understanding of elementary particles and their interactions."

Teller was noted "for his outstanding contributions to molecular physics, understanding the origin of stellar energy, the theory and application of fusion reactions, the field of nuclear safety, and for his continued leadership in science and technology."

Townes was honored "for fundamental contributions to the understanding of matter through its interaction with electromagnetic radiation and the application of this knowledge to the service of mankind, most notably in leading to the invention of the maser and the laser."

The National Medal of Science was established by Congress in 1959, authorizing the President to choose medalists in recognition of outstanding contributions to knowledge in the physical, biological, mathematical, engineering, behavioral or social sciences.

obituaries

Frederick E. Terman

Frederick E. Terman, emeritus provost of Stanford University and commonly credited with being the academic architect of Silicon Valley, died at his campus home on 19 December 1982. Born in English, Indiana, 7 June 1900, he was the son of Lewis M. Terman, the psychologist who developed the Stanford-Binet Intelligence Quotient. Frederick Terman displayed an early interest in radio. Two years after he graduated from Stanford—at age 20 with a bachelor's degree in chemical engineering—he received an engineer's degree in electrical engineering under Harris J. Ryan, widely regarded as the first professor of electrical engineering in the US. Terman earned his doctorate in 1924 at MIT under Vannevar Bush. He accepted a teaching position at Stanford, but was stricken with tuberculosis. During a year's convalescence he taught part-time and began the first of a series of textbooks on radio engineering. In 1926 he started teaching full-time.

He continued to work hard at developing courses and writing textbooks, whose success enhanced Stanford's reputation. He became a full professor and head of the department of electrical engineering in 1937. Four years later he was elected president of the Institute of Radio Engineers.

The Electronics Laboratory at Stanford in that prewar period was an attic with a leaking roof. Even under those conditions, Terman was able to attract and influence the careers of a number

of engineers who later came to have a great impact on electronics in this country. Among his students were William Hewlett and David Packard. At Terman's recommendation, another student, Edward Ginzton, began to do research with William Hansen of Stanford. Their continuing collaboration was a key element in the postwar development of linear accelerators, both for high-energy physics and for clinical applications.

When the War broke out, Vannevar Bush asked Terman to organize a radio research laboratory in Cambridge, Massachusetts, to develop radar countermeasures. Terman recruited more than 800 people to work on radar jammers, search receivers, and such ideas as "chaff" for jamming. During his first winter there Terman also

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