Greenspan wins Gold Medal from Acoustical Society

The Acoustical Society of America has awarded a Gold Medal to Martin Greenspan of the National Bureau of Standards. The Gold Medal, which is the highest honor the Society can bestow, is given to Greenspan "for wide-ranging and superlative contributions to experimental and theoretical physical acoustics, including ultrasonically induced cavitation in liquids and sound propagation in solids, liquids, and gases."

Greenspan joined the staff of the National Bureau of Standards in 1935, shortly after his graduation from the Cooper Union Institute of Technology, and maintains his NBS affiliation to this date, serving as a consultant since his retirement in 1974. Until 1946 Greenspan worked on elasticity and strength of materials. His theoretical work on engineering structures, as a member of a team under A. H. Strang, helped to set modern safety standards for structures, and his work on stress distribution on perforated plates made important contributions to modern elastic-fracture mechanics.

Since 1946, he has been working in physical acoustics as a member of the Sound Section, where he served as section chief from 1966 to 1974. In collaboration with Richard K. Cook and Moody C. Thomson Jr, he laid the foundation for our understanding of the propagation of sound in rarified gases. He was able to show that the Navier–Stokes equation gave a good approximation of the dispersion and attenuation of sound in monatomic gases even for short wavelengths approaching the mean free path. His measurements at substantially lower pressures, where the mean free path is significantly greater than the wavelength, showed substantial deviations from the Navier–Stokes results. Theoretical many-body results are now judged by their agreement with these measurements. Greenspan was able to demonstrate both experimentally and theoretically how molecular and translational relaxation in polyatomic gases combine to affect acoustic dispersion and attenuation.

In 1950, collaborating with Carl E. Tschiegg, Greenspan developed an acoustic velocimeter which serves as the prototype for the version now used by the US Navy and in industry. Again with Tschiegg, he studied the effects of dissolved gases and of neutron radiation on the threshold of cavitation in liquids. Because the cavitation thresholds determined with neutrons are reproducible, Greenspan and Tschiegg were able to determine the temperature dependence of cavitation in degassed, neutron-irradiated liquids. In collaboration with Tschiegg and Franklin R. Breckenridge, Greenspan improved acoustic emission measurements by developing a technique in which received signals were free of aberrations due to ringing or reflection. Greenspan is now working on the theoretical acoustics of the piston radiator, extending solutions for cases in which pressure and particle velocity vary over the surface of the piston.

GREENSPAN

In addition to his many scientific contributions, Greenspan has also played an active role in the acoustics community. He was president of the Acoustical Society from 1963 to 1964 and again from 1966 to 1967, having been president-elect 1965–66. He has also served on the executive council (1959–62), as chairman of the technical council (1967–68), as a member of the technical committee on physical acoustics (1961–64, 1968–71) and as the Society's representative to the council of the AAAS, to the US National Committee of IUPAP, and on the division of Physical Sciences of the National Research Council. He was editor of the *Journal of Research of the National Bureau of Standards Section C* (1962–73) and associate editor of the *Journal of the Acoustical Society* (1961–66), and he was the Society's representative on the governing board of The American Institute of Physics 1974–79.

DOE gives five Lawrence Awards

The Department of Energy has chosen five scientists to receive Lawrence Awards for their outstanding contributions to the field of atomic energy. The recipients are: George Chapline Jr of Lawrence Livermore National Laboratory; Mitchell J. Feigenbaum of Los Alamos National Laboratory and Cornell University; Michael J. Lineberry of Argonne National Laboratory; Nicholas Turro of Columbia University; and Raymond E. Wildung of Pacific Northwest Laboratory.

The awards have been given annually by DOE since they were established in 1959 as a memorial to Ernest O. Lawrence. Each winner receives a cash award of $5000, a medal and a citation.

DOE recognized Chapline "for his outstanding basic contributions in high-energy and nuclear physics, in high-energy-density astrophysics and cosmology, and in the highly creative and effective applications of atomic, nuclear and statistical physics to important national-security problems."

Perhaps best known for his studies on the theory and potential uses of x-ray lasers, Chapline was noted for "decisive contributions" to the weapons program since he came to Liver-

more in 1969. Pursuing an interest in weapons physics, he worked on problems of coherent radiation emission, particularly in the short wavelengths; his contributions in this area eventually led to the establishment of the x-ray laser program at Livermore. An x-ray laser would have both military and civilian applications; weapons experts have speculated that the pulsed x-ray laser, for example, could be used in space as a defensive weapon to destroy incoming enemy warheads. Holograms made with x-ray lasers could, for example, provide three-dimensional information on microscopic systems such as single cells.

After obtaining his PhD from the California Institute of Technology in 1967, Chapline spent 1967 to 1969 as an assistant professor of physics at the University of California, Santa Cruz, before coming to Livermore.

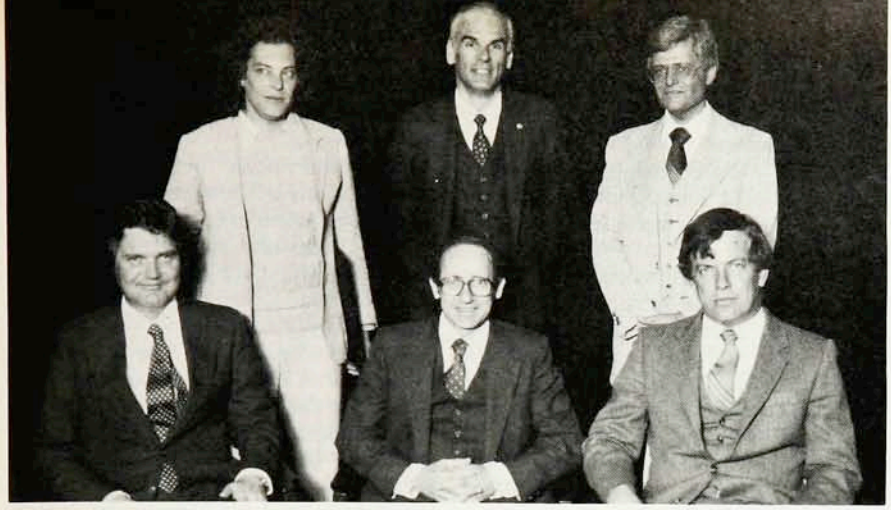
Feigenbaum was selected by DOE "for his discovery of the period-doubling route to chaos, which has furthered the understanding of a wide variety of nonlinear physical phenomena in fields as diverse as turbulence, solid-state physics, plasma physics, chemical kinetics and population biology."

While working on problems of chaotic behavior in nonlinear deterministic systems, Feigenbaum discovered simple universal properties of the motions and of the parameters that describe the transition from periodic to multiply-periodic behavior (via period doubling) and to truly chaotic, aperiodic behavior. These results allow measurable properties, such as velocity and temperature fluctuations in real fluids, to be predicted. Feigenbaum's work has also led to new research on such universal properties of conservative systems as their integratibility and stability.

He received his PhD in physics from MIT in 1970, and taught at Cornell University (1970–1972) and at Virginia Polytechnic Institute (1972–1974). In 1974, Feigenbaum came to Los Alamos, where he is now on leave from his position as a fellow of the Theoretical Division and back at Cornell as a professor of physics.

DOE cited Lineberry "for his unique and innovative contributions to the design, analysis and interpretation of fast-reactor critical experiments and their applications to fast-reactor core design methodology that have resulted in significantly improved core design, with special emphasis on heterogeneous core concepts."

His work on fast-reactor critical experiments, as well as his management of the Zero Power Plutonium Reactor Program at Argonne, have led to an increased understanding of fast-reactor physics. In this program, mockups of fast-reactor cores are operated at low



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 polymetric 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