

President awards National Medals of Science

Carrying on an annual tradition started in 1959, President Ronald Reagan presented National Medals of Science to 20 researchers at a White House ceremony on 12 March. Among the recipients were ten in physics or physics-related fields:

Solomon J. Buchsbaum, executive vice-president of AT&T Bell Laboratories, Holmdel, New Jersey, was honored for his "distinguished contributions to national science and technology policy and to the study of solid-state plasmas." Buchsbaum received his BS in 1952 and his MSc in 1953, both from McGill University; he received his PhD in physics in 1957 from the Massachusetts Institute of Technology. He worked at the MIT Research Laboratory for Electronics (1957-58) and then became a member of the technical staff at Bell Labs. He became head of the solid-state and plasma physics research department in 1961 and director of the electronics research lab in 1965. In 1968 Buchsbaum became vice-president of research at Sandia National Laboratories, remaining in that post until 1971, when he returned to Bell Labs to become executive director of research in the communication-sciences division. In 1975 he became executive director of the transmission-systems division and in 1976 vice-president of network planning and customer assistance; he was named

executive vice-president in 1979. He was an associate editor of *Physics of Fluids* (1963-64) and of *Reviews of Modern Physics* (1968-76). Buchsbaum is chairman of the White House Science Council and served as chairman of the Defense Science Board (1972-76) and of the Energy Research Advisory Board (1977-81). His research has encompassed wave motions and collective phenomena in both solid-state and gaseous plasmas.

H. Richard Crane, professor of physics emeritus at the University of Michigan, was honored for devising the first method for measuring the magnetic moments and spins of free electrons and positrons. He invented and built a prototype of a modified synchrotron that became the standard design for larger accelerators, and he was responsible for advances in biophysics, notably in the understanding of the replication of biological molecules and the unwinding of DNA. Crane measured momentum relations in beta decay, adding to the evidence for a neutrino. With his colleagues at Caltech he first produced neutrons by means of a high-voltage tube. Crane received his PhD in physics in 1934 from Caltech. He remained there as a research fellow in 1934-35. He then came to the University of Michigan as an instructor and research physicist, advancing in 1938 to assistant professor. He was named a

full professor in 1978, and was chairman of the department for 1965-72. He retired from the university in 1978. Crane was chairman of the governing board of the American Institute of Physics from 1971 until 1975.

Herman Feshbach, professor of physics at MIT, was cited as a "nationally acclaimed leader in physics by virtue of his extraordinary interest in teaching and his total commitment to scientific excellence. He has had a key role in the development of nuclear physics as a basic science." Feshbach received his PhD in physics in 1942 from MIT. He began teaching there in 1941 and became an assistant professor in 1945. Feshbach's primary research interest has been the general theory of nuclear reactions, although he has also worked in applied mathematics (acoustics). He has written two books: *Methods of Theoretical Physics*, with Philip Morse (1953), and *Theoretical Nuclear Physics*, with Amos de Shalit (1974). In 1955 Feshbach was named a full professor at MIT. He served as director of MIT's Center for Theoretical Physics from 1967 until 1973 and as head of the physics department from 1973 until 1983. In 1976 he was named Cecil and Ida Green Professor of physics, and in 1983 he was named Institute Professor. Feshbach served as president of The American Physical Society in 1976. His current research is in hypernuclear

BUCHSBAUM



CRANE

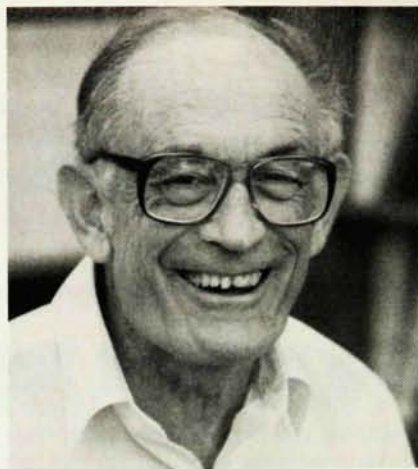


FESHBACH





HOFSTADTER



LIEPMANN



YANG

physics.

Robert L. Hofstadter, professor of physics emeritus at Stanford University, was honored for the "discovery and development of the sodium iodide scintillation counter, leading to its application to spectroscopy in virtually all branches of science and technology." Hofstadter received his AM and PhD in physics in 1938 from Princeton University. He held research fellowships at Princeton (1938-39) and the University of Pennsylvania (1939-40), taught at the City College of New York (1940-42) and was a physicist for the National Bureau of Standards (1942-43). He was a physicist and section chief at the Norden Lab Corporation from 1943 until 1946, when he returned to Princeton as an assistant professor. Hofstadter invented the sodium iodide scintillation counter in 1948 as a tool for studying the Compton effect and nuclear-transition γ rays. In 1950 he went to Stanford as an associate professor, and he was named a full professor in 1954. Hofstadter received the Nobel Prize in 1961 for his electron-scattering work on the electrical-charge structure of protons, neutrons and nuclei. He served as director of the Stanford high-energy-physics lab for 1967-74. In 1971 Hofstadter was named Max H. Stein Professor of Physics, and in 1985 he became professor emeritus. He is currently working on two research projects: the use of synchrotron radiation to study coronary arteries by angiography, and the Gamma-Ray Observatory, which is scheduled to be launched by the space shuttle in May 1988.

Hans W. Liepmann, professor of fluid mechanics and thermodynamics at Caltech, was honored for making "invaluable theoretical and experimental advances in the areas of laminar flow, instability and transition, turbulence, shock wave-boundary layer interaction, transonic flow, aerodynamic noise, magnetofluid dynamics and the mechanics of liquid helium. His work

contributed to high-speed flight, understanding aircraft buffeting, new methods for efficient combustion and a new generation of chemical lasers." Liepmann received his PhD in physics in 1938 from the University of Zurich. In 1939 he came to Caltech as a fellow in aeronautics. He became an assistant professor in 1945, and in 1976 was named Charles Lee Powell Professor of Fluid Mechanics and Thermodynamics. Liepmann has been director of the graduate aeronautics labs since 1972 (for a complete description of his research see June, page 102).

Chen Ning Yang, director of the Institute of Theoretical Physics at the State University of New York at Stony Brook, was honored for having influenced theoretical physics for many years by his profound questions and deep insight. Yang received his BSc in 1942 from the Southwest Association University in China and his PhD in physics in 1948 from the University of Chicago. After teaching at Chicago for a year, he became a member of the Institute for Advanced Study in Princeton, New Jersey, in 1949. In 1966 he left the institute to become the Einstein Professor of Physics and director of the Institute of Theoretical Physics at Stony Brook. His central research interest has been the symmetry of interactions. Yang and T.D. Lee shared the 1957 Nobel Prize for physics for their suggestion that parity is not conserved in weak interactions. Together with R.L. Mills he has done fundamental work on non-Abelian gauge fields. He is currently studying multi-particle production in high-energy collisions.

Peter D. Lax, director of the Courant Mathematics and Computing Laboratory of New York University, was honored for "outstanding, innovative and profound contributions to the theory of partial differential equations, applied mathematics, numerical analysis and scientific computations. He has formed many of the underlying princi-

ples in the field of nonlinear hyperbolic equations; his approach to scattering theory has yielded applications to the propagation of sound and light." Lax received both his AB (1947) and his PhD (1949) in mathematics from NYU. He remained there as an assistant professor of mathematics, advancing to full professor in 1958. He has served as director of the computer and mathematics center of the Courant Institute since 1963, and as head of the mathematics department since 1972.

Yuan Tseh Lee, professor of chemistry at the University of California at Berkeley, was honored for his "world leadership in the development of molecular-beam techniques and their application to the study of chemical dynamics. His work has had an enormous impact in many areas of physical chemistry, especially in building up a quantitative bridge between the laws of mechanics and complex macroscopic phenomena." Lee received his BS in 1959 from the National Taiwan University, his MS in 1961 from the National Tsing Hua University and his PhD in chemistry from the University of California at Berkeley in 1965. He taught at the University of Chicago from 1968 until 1974, and then returned to the University of California as a professor of chemistry.

Bernard M. Oliver, program manager at NASA's Ames Research Center, was cited as a "central figure in the translation of the most sophisticated physics knowledge and communications theory into practical electronics and computers, such as the hand-held scientific calculator. He has performed world-class research in the development of new radio and optical telescopes and in the field of communication theory in the universe." Oliver received both his MS (1936) and his PhD in electrical engineering and physics (1939) from Caltech. He was a member of the technical staff of Bell Labs from 1939 until 1952; he served as director of research there from 1952

until 1957. He became vice-president of Hewlett-Packard in 1957. In 1983 he retired from Hewlett-Packard and became head of the Ames center's SETI-program office.

Antoni Zygmund, professor emeritus of mathematics at the University of Chicago, was honored for his "outstanding contributions to Fourier analysis and its applications to partial differential equations and other branches of analysis. He created the strongest school of analytical research in the contemporary mathematical world." Zygmund received his PhD in mathematics in 1923 from the University of Warsaw in Poland. He taught mathematics at the Warsaw Polytechnic School from 1923 until 1930, when he became a professor at Wilno University. He taught at Mount Holyoke College from 1940 until 1945, and then became a professor at the University of Pennsylvania. In 1947 he became a professor at the University of Chicago, and in 1967 was named Swift Distinguished Service Professor of Mathematics.

National Academy of Sciences elects new members

The National Academy of Sciences has elected 59 new members, including the following researchers in physics or related fields: Peter J. Bickel, dean of physical sciences at the University of California in Berkeley; Walter Lyons Brown, head of the department of radiation-physics research at AT&T Bell Laboratories; Gerard H. deVaucouleurs, professor of astronomy, University of Texas in Austin; Gert Ehrlich, professor of metallurgy, University of Illinois at Urbana; David J. Gross, professor of physics, Princeton University; Robert W. Hellwarth, professor of electrical engineering and physics, University of Southern California; Ira Herskowitz, vice-chairman of the department of biochemistry and biophysics in the school of medicine of the University of California in San Francisco; Bertil Hille, professor of physiology and biophysics, University of Washington in Seattle; Yuet Wai Kan, professor of medicine, laboratory medicine, and biochemistry and biophysics, University of California in San Francisco; Daniel Kleppner, professor of physics, Massachusetts Institute of Technology; Brian W. Matthews, professor of physics, University of Oregon in Eugene; Frank B. McDonald, chief scientist at NASA headquarters in Washington, DC; John C. Moll, director of integrated-circuit-structures research at Hewlett-Packard Corporation, Palo Alto, California; C. Bradley Moore, professor of chemistry, University of California in Berkeley; Robert C. Richardson, professor of

physics, Cornell University; David N. Schramm, professor of astronomy and astrophysics, University of Chicago; Joseph V. Smith, professor of physical sciences, University of Chicago; and Karen Uhlenbeck, professor of mathematics, University of Chicago.

Gravity Foundation essay awards for 1986

The Gravity Foundation presented its 1986 essay awards to the following individuals: M. J. Bowick, L. Smolin and L. C. R. Wijewardhana (Yale University) shared the \$1500 first prize for their essay "Does string theory solve the puzzles of black hole evaporation?" in which they suggest that the massive modes of closed superstring theories may play a crucial role in the last stages of black-hole evaporation. Itzhak Bars and Matt Visser (University of Southern California, Los Angeles) shared the \$500 second prize for "Feeble forces and gravity." Gordon D. Pusch (Virginia Polytechnic Institute and State University, Blacksburg) received the \$200 third prize for "A new test of the weak equivalence principle." Lawrence H. Ford (Tufts University) received the \$150 fourth prize for "Does $\Omega > 1$ imply that the universe will expand forever?" Richard L. Davis (Stanford University) won the \$100 fifth prize for "Cosmological textures."

AVS selects Testoni as 1985 Varian Fellow

The American Vacuum Society has selected Anne L. Testoni, a graduate student at Northwestern University, as its 1985 Russell and Sigurd Varian Fellow for developing a pulse-counting, low-energy electron diffractometer to enable her to measure the role of surface defects in surface processes such as oxidation. The award, which consists of a \$1500 fellowship and a scale model of the pump invented in 1957 by Varian, recognizes excellence in graduate studies in vacuum science and technology; it was established in 1983 by Varian Associates to honor the company's founders.

New members for Academy of Arts and Sciences

The American Academy of Arts and Sciences has elected the following members: Ralph A. Alpher, a physicist at the General Electric Research and Development Center (Schenectady, New York); Daniel Z. Freedman, professor of applied mathematics at the Massachusetts Institute of Technology; Feza Gursey, professor of physics at

Yale University; Daniel Kleppner, professor of physics at MIT; Albert Joseph Libchaber, professor of physics at the University of Chicago; Ricardo Miledi, professor of biophysics at the University of California in Irvine; John Hamilton Reynolds, professor of physics at the University of California in Berkeley; Manfred Robert Schroeder, member of the technical staff in the Information Principles Research Laboratory of AT&T Bell Laboratories (Murray Hill, New Jersey); Charles Vernon Shank, director of the electronics-research lab of AT&T Bell Labs (Holmdel, New Jersey); and Joseph Smagorinsky, director emeritus of the geophysical fluid-dynamics lab of Princeton University. Paul J. Crutzen, professor of astronomy and earth sciences at the Max-Planck-Institut für Chemie (Mainz, Federal Republic of Germany), and Gerard 't Hooft, professor of theoretical physics at the State University of Utrecht (The Netherlands), were elected as foreign honorary members of the academy.

in brief

Jacek K. Furdyna, former director of Purdue University's materials-research laboratory, will join the University of Notre Dame in January 1987 as Aurora and Tom Marquez University Professor. Furdyna's research is on dilute magnetic semiconductors.

J. H. Carver, director of the Research School of Physical Sciences at the Australian National University in Canberra, **D. B. Melrose**, professor of theoretical physics in the School of Physics of the University of Sydney, and **E. Weigold**, professor of physics in the School of Physical Sciences of Flinders University in South Australia, have been elected fellows of the Australian Academy of Science.

Charles T. Prewitt, formerly professor of earth science and materials science at the State University of New York at Stony Brook, became director of the Carnegie Institution's Geophysical Laboratory on 1 July 1986. He succeeds the retiring director, Hatten S. Yoder Jr, who had been director of the lab since 1971.

obituaries

W. James Lyons

W. James Lyons, formerly director of research in physics at the Textile