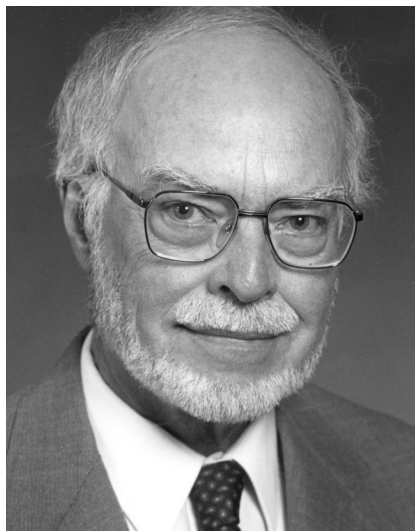


the experimental measurement of grain-boundary energies, which later led to his first scientific publication, "Magnetically Induced Grain Boundary Motion in Bismuth," in *Acta Metallurgica* (1956).

In 1955, he was hired by Clarence Zener as a research scientist at the Westinghouse Research Laboratories in Pittsburgh, where he worked until 1960 in such areas as theory and topology of grain-boundary motion; thermal grooving (theory and experiments in copper in collaboration with Paul Shewmon), surface melting; and scratch decay on surfaces. His seminal papers during this period led to a much more quantitative approach to the dynamics of morphological changes of surfaces and interfaces. He was particularly proud of his generalization to curved interfaces of John von Neumann's original $n - 6$ rule for growth of bubbles having flat interfaces in a two-dimensional soap froth. For arbitrary shapes, Bill showed that the time rate of change of area of a grain is proportional to $n - 6$, where n is its number of sides, independent of shape, provided that the driving force is a lowering of isotropic interfacial free energy and that all triple junctions make local equilibrium angles of $2\pi/6$.

While at Westinghouse Research Laboratories, Bill met one of us (Sekerka), who was fresh out of high school and had been hired as a technician, assigned to work for Bill Mullins and for Bill Tiller. This was the beginning of Sekerka's education as a materials scientist and his discovery that Bill was a compulsive and extremely talented teacher. A scientist's scientist, Bill had the ability to translate very complex ideas into new areas of understanding. He was careful and patient, especially in explaining concepts to people who lacked his own formal training in physics and mathematics. His four sons frequently remarked that they seldom got through dinner without a science lesson.

It is therefore not surprising that Bill soon opted for a career in academia. In 1960, he joined Carnegie Institute of Technology as an associate professor of metallurgical engineering. He headed the metallurgical engineering department from 1963 to 1966. From 1966 to 1970, he served as the dean of the college of engineering and science. At that time, he put in place procedures to promote excellence in scholarship and had the foresight to start a department of biological sciences. He also helped to guide the merger with the Mellon Institute, which led to the formation of Carnegie



WILLIAM WILSON MULLINS

Mellon University and the division of the college of engineering and science into the Carnegie Institute of Technology and the Mellon College of Science. Bill subsequently gave up academic administration, both to return to his love of teaching and so that his wife could complete her doctoral studies and embark on her career as a professor of education. Bill was appointed university professor of applied science in 1985.

In his research subsequent to 1960, Bill developed several new themes. He collaborated with Sekerka during the summers of Sekerka's graduate education to develop a theory of morphological stability during precipitation or solidification. This theory led to a quantitative foundation for cellular and dendritic growth. Bill also took an atomistic approach to phenomena such as crystal faceting and kinetics of crystal growth, including step interactions on vicinal surfaces.

In the 1970s, he developed a number of theories based on statistics, including diffusion with stochastic jump times, particle flow under gravity, and size distribution of impact craters. Much of this work was stimulated by his acute observations of natural phenomena; for example, a paper on contrast thresholds of random patterns resulted from his curiosity about the flickering patterns he saw while looking into a swimming pool.

Somewhat more exotic was Bill's application of Newton's laws to revolutionize an annual competition (for the amusement of students) called the faculty egg toss. The rules were very simple: Throw a raw egg as far as possible and catch it unbroken. One of us (Paxton) learned to throw (grip the end with the smaller radius) and Bill

learned to catch (avoid too much rotational momentum, which is much harder to decelerate than translational momentum), resulting in throws on the order of 100 yards and winning tosses for several years.

Bill's scientific work continued after his retirement in 1992, even through the last week before his death. Topics included variational principles for conductance in heterogeneous bodies, thermodynamics of crystalline solids, statistical self-similarity in grain growth and coarsening, and, most recently, energy barriers for shape changes of crystals with facets and nonequilibrium morphologies.

In 1963, Bill won the Mathewson Gold Medal of the American Institute of Mining, Metallurgical and Petroleum Engineers. In 1984, he was elected to the National Academy of Sciences. In 1995, he received the Materials Research Society's highest accolade: the Von Hippel Award.

In addition to his scientific work, Bill was an active supporter of social causes, including environmental issues and world peace. A conspicuous contribution to the George McGovern presidential campaign earned Bill a place on Richard Nixon's political enemies list—an achievement of which Bill was proud.

ROBERT SEKERKA

HAROLD PAXTON

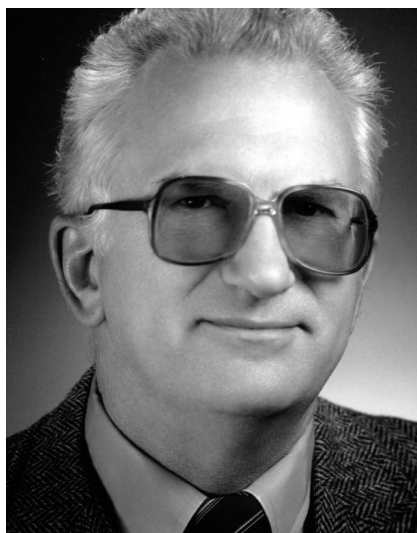
Carnegie Mellon University
Pittsburgh, Pennsylvania

William Thomas 'Tom' Pinkston

William Thomas "Tom" Pinkston, a theoretical physicist of distinction and an emeritus professor of physics at Vanderbilt University, died on 10 May 2001, at his home in Nashville, Tennessee, after a lengthy battle with cancer.

Tom was born on 19 January 1931 in Albany, Georgia. He matriculated at the Catholic University of America in Washington, DC, where he received BS (1952), MS (1955), and PhD (1957) degrees, all in physics. The topic of Tom's dissertation, supervised by James Brennan, was the structure of lithium-6 based on the nuclear shell model.

Following a term as an instructor at Princeton University from 1957 to 1959, Tom accepted an assistant professorship in physics at Vanderbilt, where he remained until his retirement in 1996. He taught physics courses at all levels, ranging from graduate courses in quantum



WILLIAM THOMAS 'TOM' PINKSTON

mechanics and nuclear theory to atmospheric physics for liberal arts students, always with a flair for the elegant as well as for careful and comprehensive analysis.

Tom was best known for developing, in 1965, the Pinkston-Satchler inhomogeneous differential equation still used as the Standard Model for calculating the nucleon overlap integrals for light nuclei. This was the first microscopic approach for treating effective nucleon-nucleon forces and had a significant effect on the development of nuclear shell models. The approach is still in use, a remarkable endurance record for an early model. Tom also contributed important results to the theory of shape coexistence in heavy nuclei, Coulomb fission, and heavy-ion potentials.

Tom was chair of Vanderbilt's physics and astronomy department for 14 of his 37 years at the university. His gentlemanly demeanor was a serviceable cloak for a resolute firmness; one of the few decorations in the chair's office during his term was the sign "What part of NO do you not understand?" Tom served on more than 70 councils and committees at Vanderbilt during his career. What one colleague called Tom's "probity of judgment" made him welcome in the most important policy councils of the university and as chair of the faculty senate from 1995 to 1996.

Outside the university, Tom served as a consultant to the US Army Missile Command in Huntsville, Alabama (1959-65) and the Oak Ridge National Laboratory (1959-66); as a councilor for Oak Ridge Associated Universities (1980-92); as a board member for the Southeastern Universities Research Association in Washington, DC (1988-

92); and as chair of the southeastern section of the American Physical Society (1987-88).

Tom directed the PhD work of about a dozen students and published many research papers or book chapters on the theory of nuclear structure and reactions. His research reputation was recognized by the Alexander von Humboldt Foundation in Bonn, Germany, which presented Tom with a Senior US Scientist Award in 1979.

Tom was an exemplary faculty member, a congenial and effective scientific leader and administrator, and a devoted husband, father, and grandfather. Those who were privileged to know him will remember his gentle good humor, the faithfulness of his friendship, his manifold kindnesses to students and colleagues—and the fact that he was an ardent and accomplished fly fisherman.

**JOSEPH H. HAMILTON
WENDELL G. HOLLADAY
MEDFORD S. WEBSTER**

*Vanderbilt University
Nashville, Tennessee*

Sidney Siegel

Sidney Siegel, a solid-state physicist who became a respected pioneer in nuclear reactor development, died of cancer on 15 March 2001 at his home in Pacific Palisades, California. He also was one of the first scientists to study the effect of radiation on solids.

Born in New York City on 10 January 1912, Siegel began his career as a physicist in the 1930s at Columbia University. At that time, solid-state physics was just emerging as a specific branch of physics. He earned his bachelor's degree in physics at Columbia in 1932. As a graduate student under S. L. Quimby, Siegel was one of the first to experimentally investigate the relationship between magnetic and mechanical properties of nickel. This investigation was aimed at testing some consequences of Werner Heisenberg's 1932 theory of ferromagnetism. Siegel received his PhD in physics in 1936; his thesis was on the relationship between the magnetic and mechanical properties of nickel.

During World War II, working as a research engineer with the Westinghouse Electric Corp in Pittsburgh, Pennsylvania, Siegel helped develop an influence exploder for electric torpedoes and an airborne radar system. After the war, in 1946, Westinghouse sent Siegel to participate at what is now Oak Ridge National Laboratory in the design of a pilot-scale, gas-



SIDNEY SIEGEL

cooled reactor for civilian power—the Daniels power pile. The reactor was designed with graphite as a moderator. Eugene Wigner, then director of ORNL, had predicted that graphite in a reactor would swell and otherwise deteriorate under the intense bombardment of fast neutrons. Siegel, with his background in solid-state physics, was one of the earliest pioneers in the study of this so-called Wigner effect.

While at ORNL, Siegel attended the Oak Ridge School of Reactor Technology. Many of the alumni of this school became prominent figures in the unfolding American development of power reactors. Among the students was (then) Captain H. G. Rickover.

In 1949, Siegel returned to the newly organized Bettis Field reactor laboratory, which was operated by Westinghouse for Rickover's Naval Reactor Branch of the Atomic Energy Commission. At the time, two naval reactors were being worked on: a sodium-cooled intermediate neutron reactor (SIR) at General Electric and a pressurized water thermal neutron reactor—originally called submarine thermal reactor (STR) and, later, pressurized water reactor (PWR)—at Westinghouse. Although prototypes of both reactors were built, the US Navy adopted the Westinghouse STR rather than the GE SIR.

Siegel played an important role in these earliest days of naval reactors, when many combinations of coolant and moderator were proposed and some were actually built. He assembled and then headed a group of capable young physicists and engineers to conduct the critical experiments on the core of the STR and to analyze the reactor's solid-state aspects. But of