We Hear That

NWO Awards Spinoza Prize

The Netherlands Organisation for Scientific Research (NWO) honored the winners of the NWO Spinoza Prize for 2004 at a ceremony this past November in The Hague. This prize is the Netherlands' top award to researchers for their scientific work. Each winner received C1.5 million ($1.7 million) and a statuette of 17th-century Dutch philosopher and theologian Benedict de Spinoza.

Ben Feringa, Jacobus van 't Hoff Distinguished Professor of molecular sciences at the University of Groningen, was hailed by NWO for his "work on molecular motors and extremely selective catalysts." He invented the first molecular motor powered by light, and his research group focuses on design and synthesis of complex molecules that can be used as molecular motors, switches, or catalysts.

NWO cited **Jaap Sinninghe Damsté** for his "biological, geological, and chemical work on fossil molecules in sediments." According to NWO, "his research into chemical fossils rewrote the theories about the carbon and sulphur cycles." As a molecular biogeochemist, he analyzes specific organic compounds and uses the information to reconstruct the life and climate of earlier epochs. Sinninghe Damsté is head of marine biogeochemistry and toxicology at the Royal Netherlands Institute for Sea Research and a professor of molecular paleontology at Utrecht University.

Astronomer **Michiel van der Klis** received the award for his "pioneering research into x-ray radiation from binary stars," according to the citation. Van der Klis is a professor of astronomy at the University of Amsterdam's astronomical institute. In the 1990s, his group discovered the first x-ray star that rotated at 400 times per second, the existence of which had been predicted 16 years previously but had not yet been proved. His studies provide data about the mass, radius, and rotational speed of neutron stars and black holes, as well as insights into the general theory of relativity.

Obituaries

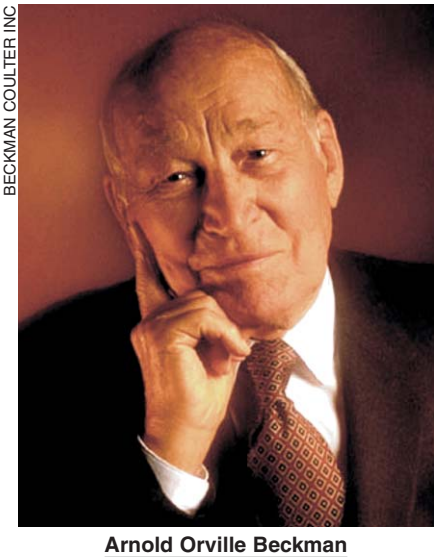
Arnold Orville Beckman

Arnold Orville Beckman, renowned scientist, inventor, and philanthropist, died at age 104 on 18 May 2004 in La Jolla, California.

Beckman was born on 10 April 1900 in the small town of Cullom, Illinois. His father, a blacksmith, encouraged his son's early interest in science. On Beckman's 10th birthday, his father gave him a small shed as a makeshift laboratory. Twelve years later, Beckman received a BS in chemical engineering from the University of Illinois at Urbana-Champaign. He stayed at Illinois to earn an MS in chemistry in 1923 and then began graduate work at Caltech.

He left during his first year to be with his fiancée in New York. The move, driven by romance, proved propitious for his subsequent career, because he went to work for Walter A. Shewhart at the Western Electric Engineering Laboratory, the forerunner of Bell Labs. Shewhart was a pioneer in the developing area of standardization, testing, and quality control. Beckman put the lessons learned under Shewhart's mentoring to good use later in life. At Western Electric/Bell Labs, Beckman also learned about electronic technology.

He returned to Caltech, and in 1928 received a PhD for work on the photochemistry of hydrazine and hydrazoic acid with Roscoe Dickinson. He joined the Caltech faculty and quickly became known for his skill at conducting experiments and for his inventiveness. In response to a request from a friend from his Illinois days, Beckman built the first pH meter, an electronically driven device for measuring the concentration of hydrogen ion in water. His pH meter was the forerunner of analytical instruments that integrate a sensor and some form of electronic signal processing. It proved to be very popular. In 1939, when the nation was still in the throes of the Depression, Beckman left his faculty position at Caltech to become a full-time inventor and entrepreneur.


BECKMAN COULTER INC

Arnold Orville Beckman

Beckman Instruments soon became a leading manufacturer of scientific instrumentation. The Beckman model DU, which appeared in 1941, was the first UV–visible spectrophotometer to merge optics and electronics into a single instrument, and more than 30 000 units of this famous lab workhorse were sold. The DU and other company instruments were vital to the defense of the US during World War II: The DU was an essential tool in many research projects; the Beckman IR spectrophotometers greatly advanced the synthetic rubber research program; and a militarized version of the "Helipot," the multi-turn potentiometer that Beckman had patented, became a ubiquitous feature of radar consoles and other electronic gear.

Even as Beckman Instruments became a leading manufacturer of scientific equipment in the postwar era, Beckman gave generously of his time to civic causes. Notably, as president of the Los Angeles Chamber of Commerce, he played a leading role during the 1950s in assembling the scientific team that released a definitive study of the origins of the photochemical smog plaguing the Los Angeles basin.

In 1980, after he relinquished his active role at Beckman Instruments, Beckman and his wife, Mabel, turned to philanthropy. They established the Beckman Foundation, and within a few years, they made major monetary gifts for the construction of research centers and institutes at the University of California, Irvine; the University of Illinois at Urbana-Champaign; Caltech; Stanford University; and City of Hope, a cancer research and treatment center near Los Angeles. They also funded the construction of the Beckman Center of the National

Academies in Irvine and gave millions of dollars to many institutions in support of the sciences. The Arnold and Mabel Beckman Foundation continues their legacy through its promotion of basic research and science education in the chemical and life sciences. Especially significant are programs that provide support to assistant professors (Beckman young investigators); undergraduate research students (Beckman scholars); and K–6 hands-on science instruction (Beckman@Science).

The many recognitions Beckman received include the National Medal of Technology (1988), the National Medal of Science (1989), and the Lifetime Achievement Award of the National Inventors Hall of Fame (2004).

Beckman was warm, loyal, and caring, and he lived by a set of values that owed much to his Midwestern small-town origins. He is remembered as the scientist who started the instrumentation revolution that changed the course of chemistry and biology in the 20th century, as the thoughtful philanthropist who generously supported fundamental scientific research at many institutions, and as the remarkable human being who helped launch the careers of young investigators who shared his love of science.

Theodore L. Brown
Bonita Springs, Florida
Harry B. Gray
California Institute of Technology
Pasadena, California

Hans Bömmel

Hans Bömmel, who broke new ground in the field of high-frequency ultrasound, died from a lung infection on 19 March 2004 after a brief illness. Although he had gradually lost his vision and hearing a few years before his death, he had remained mentally alert.

Bömmel was born on 15 October 1912 in Munich to a German father and Russian mother. When he was barely three years old, his father died. Later, because of Bömmel's ill health—presumably asthma—his mother moved the pair to Davos, Switzerland. There, he attended school and acquired his bachelor's degree in sciences in 1932 at the German Alpine College called Fredericianum. His intelligence drew the attention of his teachers, and he began science studies the following year at the University of Zürich.

That same year, his mother became seriously ill, so Bömmel interrupted his studies to care for her until her death in 1935. His financial resources had dried up and, because it was a period of extreme hardship due to the worldwide depression, he accepted any work to be able to pay his bills. In 1939, he was drafted into the German army, the Wehrmacht. Fortunately, Zürich granted him Swiss citizenship that year, but as a consequence, he was drafted into the Swiss army.

Having completed his tour of duty during World War II, he returned to the University of Zürich, where he defended his doctoral thesis in 1943. His thesis, entitled "Measurement of Velocity and Absorption of Ultrasonic Waves in Gases by Means of Optical Methods," was prepared under the guidance of his adviser, Richard Bär. Bömmel accepted an offer in early 1944 from EMPA, the Swiss Federal Material Testing Institute in Zürich, but stayed for only a few months before returning to the University of Zürich later that year as a postdoc of Edgar Meier. Meier was subsequently replaced by Hans Staub, who had previously been involved in the Manhattan Project.

Staub, an impulsive person, was a serious mismatch for the gentle and creative Bömmel. Gregor Wentzel recommended Bömmel for a postdoctoral position at Bell Labs in Murray Hill, New Jersey, and Bömmel joined the ultrasonics group of W. P. Mason there in 1953. During his first year at Bell Labs, he published spectacular results about the ultrasonic attenuation in normal and superconducting lead, four years before the Bardeen-Cooper-Schrieffer theory was published. His results became a cornerstone for a test of that theory. Barely two years later, he published his results on the magnetoaccoustic absorption in normal metals; those findings led to measurements of the Fermi surface's diameter. At that time, theoretical methods of band structure calculations were developed intensively, and Bömmel's method—besides others, such as measurements of the de Haas–van Alphen effect—was a welcome way of testing theoretical calculations.

Hans Bömmel

In the late 1950s, Bömmel published a series of groundbreaking papers, with Klaus Dransfeld, on microwave acoustics. Those works inspired a number of developments, such as the acousto-optic modulator by Gary Starkweather at the Xerox Corp and the scanning acoustic microscope by Charles Quate of Stanford University. Bömmel's collaboration with Dransfeld also led to an interesting application of microwave acoustics to the Mössbauer effect: testing the equivalence of gravitational and inertial mass by accelerating steel spheres in a vacuum in an inhomogeneous field up to the limit of mechanical strength of the spheres.

Bömmel left Bell Labs for UCLA in 1961 to establish a solid-state research group. While there, he extended his expertise to high-pressure physics and nuclear acoustic resonance. In 1968, he was offered a key position—for which he had been recommended by Nobel laureate Max Delbrück—involving setting up the physics faculty at the new University of Konstanz in Germany. Bömmel found the job offer attractive because he would be able to develop both new ideas for research and new teaching methods, plus interact with members of the various faculties, and he accepted it.

His early years at Konstanz coincided with the period of student rebellion known as the '68 movement, in which leftist radicals questioned the authority of more experienced scientists and split various academic groups. Bömmel helped end the chaotic situation and restore the decision-making hierarchy among scientists at the university.

Having clear, rational concepts, Bömmel fought for his ideas. He was a conservative in the very positive sense who was open to new ideas and developments. For example, he established solid-state physics as the ideal subject of research in the physics department at Konstanz to offer the best possibility of interdepartmental collaboration.

Bömmel was an outstanding scientist with a wide spectrum of interests in and knowledge of history, cosmology, political science, and other topics, and a highly respected person because of his intelligence, foresight, integrity,