

lar biology and a professor in the Princeton Materials Institute at Princeton University, will join Stanford's biology and applied physics departments in September—the first joint appointment between those two departments. Block plans to work with physicist **Stephen Chu** and biochemist **James Spudis** in developing the university's proposed Bio-X biophysics research initiative.

Masanobu Miyahara, a senior scientific affairs adviser in the National Science Foundation's Tokyo office, was honored in December with the agency's Distinguished Public Service Award for lifetime achievement. Of his 41 years of

Federal service, nearly 37 have been with the NSF.

Alex Bradshaw will become the new director of the Max Planck Institute for Plasma Physics in Garching, Germany, on 1 May. Bradshaw is currently at the Fritz Haber Institute of the Max Planck Society in Berlin.

Also on 1 May, **Jan M. Rost** will leave his post as an assistant professor of physics at the University of Freiburg to become one of the three directors of the Max Planck Institute for the Physics of Complex Structures in Dresden, Germany.

OBITUARIES

James Lighthill

With the death, on 17 July 1998, of James Lighthill in a swimming accident, the world of fluid dynamics has, arguably, lost its leading exponent of the past half century.

Born in Paris on 23 January 1924, Lighthill was christened Michael James, but later abandoned his first name. He was a boyhood contemporary of Freeman Dyson at Winchester College. In 1943, he took a BA in mathematics at the University of Cambridge's Trinity College and then joined Sydney Goldstein's group at the UK's National Physical Laboratory for work on supersonic aerodynamics in the last two years of World War II.

Lighthill's first papers were published before he was 20, and, by the age of 26, he had succeeded Goldstein as Beyer Professor of Applied Mathematics at the University of Manchester. There, in 1952, he published a paper entitled "On Sound Generated Aerodynamically," which not only prescribed the calculation of sound from turbulent flows and derived the eighth power law for jet noise, but also, and more fundamentally, created the subject of aeroacoustics and underpinned all subsequent work in it.

Aeroacoustics proved to be just the first of several new disciplines that Lighthill launched. Another of his notable launches was nonlinear acoustics, which was first introduced in a 100-page article published in 1956 in honor of G. I. Taylor.

On a completely different tack, Lighthill made generalized functions accessible and placed them on a firmly rigorous basis in a delightful book entitled, *An Introduction to Fourier Analysis and Generalized Functions* (Cambridge University Press, 1958), which he wrote for third-year Manches-

ter undergraduates. Although I. M. Gelfand and G. E. Shilov's approach to distributions is now considered more powerful, Lighthill's methods, as expounded in his book, may have had the greater impact.

In 1959, Lighthill became director of the UK's Royal Aircraft Establishment, Farnborough, where he managed a staff of 8000, including 1400 professional scientists. While continuing to produce research papers (he had his own series of RAE reports!), he also directed work on supersonic conical vortex flows (for the Concorde), developed satellite communications systems and established RAE's space department and space program.

In 1964, he returned to academia—this time as a Royal Society research professor at the University of London's Imperial College, where he founded the field he called biofluidynamics. This field encompasses blood flow in the cardiovascular system, air flow in mammalian airways, the flying of birds

and insects and the swimming of fish. One of Lighthill's striking biofluid-dynamic discoveries was the mechanism by which the tiny parasitic wasp *Encarsia formosa* claps and flings its wings to achieve lift coefficients far greater than those obtained by other flying objects, whether man-made or natural.

In 1969, Lighthill (who was knighted in 1971) succeeded Paul Dirac as holder of the Lucasian Professorship of Mathematics at Cambridge, though when Lighthill referred to his "predecessor in the chair," one knew he had Isaac Newton in mind. At the university's department of applied mathematics and theoretical physics, Lighthill taught with great verve and worked extensively on waves, geophysics, active control, acoustics and biological mechanics. He left Cambridge in 1979 to head University College London as provost until he retired ten years later.

Lighthill's scientific legacy, which takes the form of around 160 papers and five books, contains seminal contributions to fluid dynamics and applied mathematics, together with the establishment of two major institutions—namely, the Institute of Mathematics and its Applications (the UK counterpart, in some ways, of the Society for Industrial and Applied Mathematics in the US), and the International Institute of Acoustics and Vibration, both of which he served as founding president. Furthermore, he was president of the International Commission on Mathematical Instruction (1971–74) and of the International Union for Theoretical and Applied Mechanics (1984–88), and held many other organizational posts, including vice president of the Royal Society (he became a fellow at 29) and associate editor for 24 years of the *Journal of Fluid Mechanics*.

His scientific achievements were recognized by the award of 24 honorary doctorates, numerous medals and membership of the most prestigious academies worldwide, including the American Academy of Arts and Sciences and the US National Academy of Sciences.

His achievements outside science were equally impressive—and flamboyant. He mastered several languages (French, German, Portuguese, Russian), largely, he claimed, through reading the classics in them ("One knows them so well that the tedious step of translation is obviated"). He could play the piano to a good concert standard. And he achieved such command of his own physical and mental powers that he successfully accomplished many of what he termed "adventure swims," each typically of ten hours duration and involving treacherous cur-



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rents and other natural and manmade hazards. (Stromboli's volcano erupted 14 times during his circumnavigation of that island, for example.) And of course, he gave no thought to the comfort of using insulating grease or a wet suit, or to the precaution of having a support boat along.

His sudden death was caused by an undiagnosed mitral valve condition revealed, tragically, by the final exertions of his seventh swim round the island of Sark in the English Channel, a feat that he was the first to accomplish—at the age of 49.

Lighthill died as he lived—boldly, enthusiastically and very much larger than life.

DAVID CRIGHTON

*University of Cambridge
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Ernst Ising

Ernst Ising, originator of the widely applied model that bears his name and an emeritus professor of physics at Bradley University, died at his home in Peoria, Illinois, on 11 May 1998, the day after his 98th birthday.

Born in Cologne, Germany, Ernst began studying mathematics and physics at the University of Göttingen in 1919. He continued his studies at the University of Bonn and then at the University of Hamburg, where his teacher, Wilhelm Lenz, suggested that he turn to theoretical physics—in particular, to a model of ferromagnetism that Lenz had introduced in 1920.

In studying for his doctoral degree, which he received at Hamburg in 1924, Ernst focused on the special case of a linear chain of magnetic moments that can adopt only two positions, up and down, and that are coupled by interactions between nearest neighbors.

It was probably through the publication, in 1936, of a paper by Rudolf Peierls entitled "On Ising's Model of Ferromagnetism" that this famous model acquired the "Ising" epithet. In the hands of others, notably Hendrik Kramers, Gregory Wannier and Lars Onsager, the model proved strikingly successful in the search for the phase transition between the ferromagnetic and the paramagnetic state.

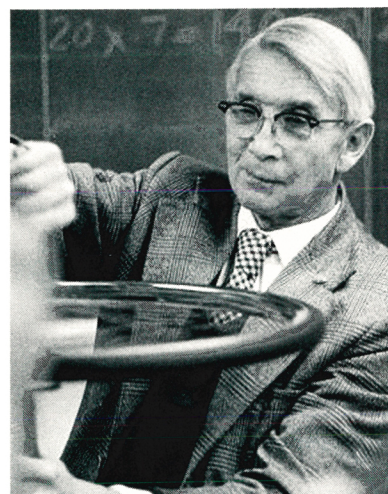
Ernst, however, knew nothing of his model's success at that time. After earning his PhD, he taught at public high schools in Germany, but was dismissed soon after Adolf Hitler came into power in 1933. From 1934 to 1938, he was a teacher and headmaster of a Jewish boarding school in Caputh near Potsdam, Germany. In Caputh, Ernst and his wife Jane found themselves neighbors to Albert Einstein, who had a summer home there. Ernst enjoyed

telling how he took his daily baths in Einstein's bathtub because he and Jane did not have a bathroom in their home.

In November 1938, the school at Caputh was destroyed by the Nazis and Ernst and Jane were forced to leave Germany the following year. They fled to Luxembourg with plans to emigrate to the US as soon as possible. When the Germans invaded Luxembourg in 1940 and rounded up most Jews a year later, Ernst and other men who were married to non-Jews were forced to dismantle the Maginot Line railroad in Lorraine. For the next four years, Ernst and Jane worked at menial jobs, struggling to survive.

They finally got to the US in 1947, and Ernst taught physics and mathematics at the State Teachers College in Minot, North Dakota. A year later, he came to Peoria and Bradley University, where he taught in the physics department until his retirement in 1976.

Ernst's life was forever changed by World War II. He never returned to his early research. In fact, it was not until 1949 that he found out from the scientific literature that his model had



ERNST ISING

become widely known. Today, the Ising model is a widely used standard model of statistical physics. Each year, about 800 papers are published that use the model to address problems in such diverse fields as neural networks, protein folding, biological membranes and social behavior.

In the postwar years, Ernst's great passion was for teaching, at which he excelled. His students will never forget his elaborate classroom demonstrations.

Ernst was a sensitive, artistic man who loved travel and the arts. He had a keen mind and sharp sense of humor, but was a gentle, quiet individual who always seemed a little shy when questioned about his famous model.