obituaries

To notify the community about a colleague's death, subscribers can visit http://www.physicstoday.org/obits, where they can submit obituaries (up to 750 words), comments, and reminiscences. Each month recently posted material will be summarized here, in print. Select online obituaries will later appear in print.

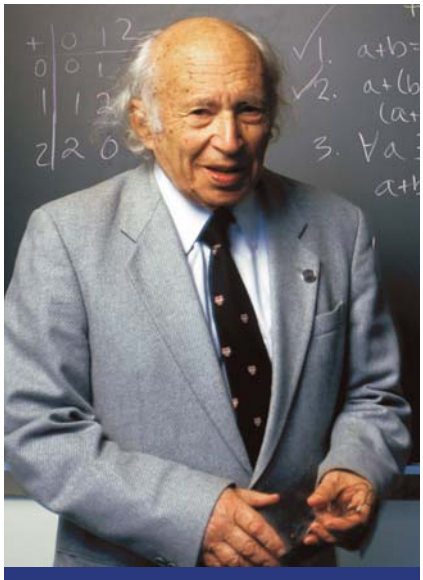
Israel Moiseevich Gelfand

Israel Moiseevich Gelfand—one of the most original and versatile mathematicians, whose contributions had a profound effect on the study of theoretical and quantum physics—died in New Brunswick, New Jersey, on 5 October 2009.

Gelfand was born on 2 September 1913 in the small town of Okny near Odessa in Russia. He was expelled from school in the ninth grade because he was the son of a "bourgeois element"—his father was a mill manager—so he learned mathematics on his own. In a 1989 interview with the Russian magazine *Kvant*, translated into English for *Quantum* in 1991, he recounted, "It's my deeply held conviction that mathematical ability in most future professional mathematicians appears precisely at that time—at 13 to 16 years of age. . . . This early period formed my style of doing mathematics. The subject of my studies varied, of course, but the artistic form of mathematics that took root . . . became the basis of my taste in choosing problems that continue to attract me right up to the present time."

In 1930 Gelfand moved to Moscow. His next twist of fate was one of many paradoxes of Soviet life. Because of his status as a bourgeois element's son, he could not enroll as an undergraduate student at a university. However, at 18 he taught at a technical college, and at 19 he entered the PhD program at Moscow State University without a diploma from college or even high school. The reason was simple: Although the Soviet Union used all possible resources to provide an education for the future elite that had "proletarian origins" and to keep others out of higher education, it did not bother to regulate graduate schools at that time.

Gelfand's thesis adviser was Andrei Kolmogorov, who taught that a true mathematician must be a philosopher of nature. In 1935 Gelfand defended his thesis, "Abstract Functions and Linear Operators," and in 1940 he obtained a doctor of science degree. In 1933 he began teaching at Moscow State. He became a full professor in 1943 but lost the position temporarily in 1952 during Joseph Stalin's anti-Semitic campaign. He worked at the Steklov Mathematical Institute starting in 1939, and in 1953 he moved to the Institute of Applied Mathematics. After World War II he took part in the Soviet version of the Manhattan Project.



RUTGERS UNIVERSITY

Israel Moiseevich Gelfand

In 1989 Gelfand moved to the US. He spent a year at Harvard University and MIT before becoming a professor at Rutgers University, where he worked until his death.

Gelfand became a worldwide celebrity among mathematicians after introducing in one of his early papers the idea of considering maximal ideals of Banach algebras as points of a topological space—an approach that had a great impact in modern mathematics. The paper clearly demonstrated Gelfand's style: Turn hard theorems into easy ones.

Gelfand produced a cascade of fundamental contributions in different areas, partly described in his celebrated six-volume monograph *Generalized Functions*. In 1978 he received the Wolf Prize "for his work in functional analysis, group representation, and for his seminal contributions to many areas of mathematics." It was a recognition of his enormous influence on modern mathematics and physics. Surprisingly, the fundamental work on Gelfand–Tsetlin bases, a household term in representation theory, was at first ignored by mathematicians but heavily used by theoretical physicists.

One of his favorite subjects was integral geometry, which he developed with Simon Gindikin and Mark Graev. It is now used to convert the data of magnetic resonance imaging and computerized axial tomography scans into three-dimensional images.

Gelfand noticed that the index of an elliptic operator is a homotopy invariant of the leading symbol; that observation led to the celebrated Atiyah–Singer index theorem, which explained that for an elliptical operator on a compact manifold, the dimension of the space of solutions can be defined in terms of topological data. He wrote classical papers on differential equations and integrable systems with Boris Levitan and Leonid Dickey, and he originated with Dmitry Fuchs the study of the cohomology of Lie algebras of vector fields, which has numerous connections in physics. His work with Graev, Mikhail Kapranov, and Andrei Zelevinsky on hypergeometric functions is widely used in mirror symmetry.

The legendary Gelfand Monday seminar he organized at Moscow State was a mathematical stock exchange, a breeding ground for young scientists, a one-man show, and much more. Gelfand interrupted every speaker with comments such as "Do not learn secondhand physics from mathematicians; talk to real physicists" and "You are trying to play violin just by listening to a symphony orchestra." His

Recently posted notices at http://www.physicstoday.org/obits:

Mukul R. Kundu
10 February 1930 – 17 June 2010
Robin Keeley
15 August 1944 – 17 May 2010
Dax Copp
25 April 1922 – 4 April 2010
John Callomon
7 April 1928 – 1 April 2010
Leslie Hodson
15 July 1925 – 1 March 2010
Wynford Harries
1 June 1923 – 3 March 2009

motto was, "My seminar is for high-school students, decent undergraduates, bright graduates, and outstanding professors."

Out of Gelfand's passion grew his famous correspondence school, also based at Moscow State, for mathematically gifted students. He wrote several textbooks—for his school and for universities—that each bear an imprint of his style and personality.

Gelfand's interests spread far beyond mathematics. He also published papers in biology, physiology, and other fields.

The mathematics and physics communities will greatly miss Gelfand's sharp-minded personality, his legendary intuition, and his unique ability to see the universe in a drop of water.

Vladimir Retakh
Rutgers University
Piscataway, New Jersey

AIP ESVA, GALLERY OF MEMBER SOCIETY PRESIDENTS, PT COLLECTION

Edmund Leonard Jossem

Edmund Leonard Jossem

An accomplished physicist, visionary leader in physics education, and strong and effective member of the physics community, Edmund Leonard Jossem died on 29 August 2009 in Columbus, Ohio. With his death we lost an ardent supporter of physics—in the laboratory, in the classroom, and in the community.

Born in Camden, New Jersey, on 19 May 1919, Len received his BS in physics from City College of New York in 1938 and his MS in physics in 1939 from Cornell University. During World War II, while a graduate student and teaching assistant, Len was asked by his thesis adviser, Lyman Parratt, to join an "important research project in an unspecified location." Len arrived in New Mexico in July 1945 and became a member of the scientific staff at Los Alamos. He first worked on electronic instrumentation; following the Trinity atomic bomb test, he switched to measuring thermonuclear reactions. After the war he returned to Cornell, where he received his PhD, with his thesis entitled "The X-Ray Spectra of Potassium and Chlorine in Potassium Chloride," in 1950. He left Cornell in 1956 to join the Ohio State University as an assistant professor.

Len's experience at Los Alamos led to his participation in the Association of Los Alamos Scientists, which was concerned with how to use and control nuclear power. Hoping to educate the public about the danger, the association sent samples from the Trinity explosion to the mayors of the 42 largest cities. As Len said later, "It didn't have the effect we wanted it to have."

At Ohio State, Len moved up through the ranks, becoming an associate professor in 1959 and a professor in 1964. In 1967 he became chairman of the physics department, a position he held until 1980. He retired in 1989 after 33 years of teaching.

Len's expanded role in physics edu-