

While at the University of Illinois as a postdoctoral research associate in 1970–73, Jacob changed his field of research from condensed matter physics to pulsars, the newly discovered rapidly spinning neutron stars. He returned to Hebrew University in 1973 to take a series of positions at the Racah Institute, where he played a key role in developing the astrophysics program, becoming Hebrew University's youngest full professor in 1977. An outstanding popular lecturer, Jacob interviewed leading scientists and examined their work on "Tatzpit" ("Observation"), an immensely popular weekly program he created for Israeli television in the early 1980s; it received the Israeli equivalent of the Emmy.

From 1982 to 1984 Jacob was a visiting professor at Columbia University, and in 1984 he became a professor of physics there. In 1994 he was appointed deputy chairman of Columbia's department of physics and codirector of the Columbia Astrophysics Laboratory.

Jacob participated in the first investigations of the unpinning of neutron superfluid vortices in neutron star crusts as the origin of spin-period "glitches" in pulsars. Immediately after the discovery of the first millisecond pulsar, he was among those who proposed that millisecond pulsars are weakly magnetized neutron stars that have been spun up to millisecond rotation periods by accretion in x-ray binaries. The idea of accretion spin-up of neutron stars to millisecond pulsars—since borne out by observations of many such systems—was a leitmotif in Jacob's subsequent work. Recent work included seminal research on the "normal branch" quasiperiodic x-ray intensity oscillations from the accretion disks and recurrent transient x-ray flares in some neutron star binaries.

In all this work, Jacob's coworkers cherished his clear and innovative physical insights and his flair for illuminating basic features in simple but ingenious ways. He was also a stimulating and devoted teacher whose approach in the classroom reflected the originality and simplicity that characterized his research. He will be remembered for his warmth, happy disposition and generosity and for his devotion to his exceptionally talented family.

ALI ALPAR

*Middle East Technical University
Ankara, Turkey*

TSVI PIRAN

*Hebrew University
Jerusalem, Israel*

DAVID PINES

*University of Illinois
Urbana, Illinois*

MALVIN RUDERMAN

*Columbia University
New York, New York*

John Louis Vossen

John Louis Vossen, a good friend and colleague of many in the vacuum and thin-film communities, passed away suddenly of an aneurysm on 20 May 1995, at the age of 58.

A 1958 graduate of Saint Joseph's College in Philadelphia, John spent the next 27 years with the RCA Corp. In 1965 he joined RCA's David Sarnoff Research Laboratory in Princeton, New Jersey, where he began the work in thin films and sputtering processes that established him as an authority in those fields. In 1978 he became the manager of the thin film technology laboratory at the David Sarnoff Lab, which was responsible for the research, development and commercialization of a wide variety of applications of thin film deposition and etching processes involving a vacuum environment. Under his leadership this laboratory became one of the foremost US groups devoted to thin films. In 1986, foreseeing the demise of company-sponsored research as we had known it, he formed his own very successful consulting firm in Bridgewater, New Jersey, specializing in thin film areas.

John's career encompassed the broad area of physical vapor deposition in the emerging electronics and semiconductor industry. His major contributions were in the application of plasma-based processes to industrial manufacturing. He made key contributions to advances in metallization and to the development of sputtered dielectrics, sputter and plasma etching processes and transparent conductors. He coedited several editions of the book *Thin Film Processes* (Academic Press, 1978), which has become a classic in the field. He also coedited several volumes of the "Physics of Thin Films" series (vols. 12–20, Academic Press). A prolific writer, he published extensively on the applications of rf sputtering. His early papers became classics in the field. His emphasis was always on practical implementation; he held more than 25 patents.

John was an active member of the American Vacuum Society for over 25 years, serving in the thin-film division, as a founding member of the greater New York chapter, on many committees and finally as president of the society in 1984. During John's presidency AVS was unwillingly thrust into international politics in a conflict with the US Government, which wished to require organizers of conferences to place restrictions not only on those who attended but also on the content of their papers. John played a key role in this incident as a firm advocate for the

freedom of scientific societies. He also served as a director of the governing board of the American Institute of Physics (1981) and as a director of the Society of Vacuum Coaters (1991–95).

The facts of John's technical activities do not do justice to the person. John was a man who could always be counted on to fulfill any responsibility he accepted. He was honest with himself and with others. He was a man of principle who looked through the pretenses and posturing of those who considered themselves powerful, and he could poke fun at himself as well as others. John will be missed by all who knew him, especially those who worked in his old group at the RCA laboratories.

**DOROTHY M. HOFFMAN
BAWA SINGH**

*David Sarnoff Research Center
Princeton, New Jersey*

TED MADEY

*Rutgers University
Piscataway, New Jersey*

Leopoldo M. Falicov

Leopoldo M. Falicov, a professor of physics at the University of California, Berkeley, died of cancer in Berkeley on 24 January 1995, at the age of 61. He was a distinguished condensed matter theorist and teacher who was known internationally for his tireless service to science and education.

Born in Buenos Aires, Argentina, Falicov received his Doctor en Fisica degree from the Instituto J. A. Balseiro of the University of Cuyo in Argentina in 1958. He then went to England, where he obtained his PhD in physics from the University of Cambridge in 1960.

Falicov then went to the James Franck Institute at the University of Chicago. He became a full professor in 1968 and came to Berkeley in 1969.

While at Berkeley, Falicov served concurrently as a senior scientist in the Materials Sciences Division of the Lawrence Berkeley Laboratory, and he held visiting appointments at more than 20 universities around the world. He chaired the Berkeley physics department from 1981 to 1983.

Falicov's lectures, publications and research reflected his clarity of thought and precision. Using geometrical illustrations and creative models, he solved problems related to the electronic structure of solids, superconductivity, magnetism, surfaces and phase transitions. The intense experimental research on Fermi surfaces of metals and semimetals in the 1960s and 1970s produced data that could be viewed as parts of puzzles. Falicov proposed Fermi surface geometries that allowed consistent interpretation of the data and

brought the puzzle pieces together. Some of the Fermi surface constructions were considered to be works of art, such as the Falicov monster for magnesium and his poisoned-turnips model for arsenic; these pictures often adorned textbooks and conference proceedings.

Not only was Falicov a popular classroom teacher, he was also in great demand as the closing speaker for conferences. He was capable of assimilating what was presented and with good judgment could deliver a clear, logical and engaging lecture accurately summarizing days of presentations.

Service was a high priority for Falicov. He rarely said no when asked for help and was able to meet deadlines because of his excellent ability to distill information and deal honestly and directly with issues. His service to international science, particularly as an adviser to countries in South and Central America and Mexico, will be sorely missed; he fostered worldwide collaborations.

He retired from the university in 1994, but his high level of activity continued, both professionally and personally. He was known to his friends and colleagues as someone who loved opera, could recite poetry and quote literature in three languages, and he collected art and played the piano. His service, teaching and research record are a model for a faculty manual.

MARVIN COHEN

*University of California, Berkeley
Berkeley, California*

Charles Sydney Smith Jr

Charles Sydney Smith Jr, University Distinguished Professor of Physics Emeritus at the University of North Carolina at Chapel Hill, died on 4 September 1994 after a two-month struggle with congestive heart disease. With Chuck's death, the scientific community lost one of the pioneers of solid-state physics.

Chuck was born in 1916 in Lorain, Ohio. He graduated from Case Institute of Technology in 1937 and received his ScD from MIT in 1940. After two years as an instructor at the University of Pittsburgh, he returned to Case and taught in its physics department for 26 years, serving as chairman during 1958–59.

He came to the University of North Carolina in 1968 as director of its Materials Research Center and as a university distinguished professor. After his retirement in 1981 and right up until his final illness, he continued to teach advanced undergraduates and graduate students the techniques of x-ray diffraction and to lend his skills

to the research projects of his younger colleagues.

Chuck was a thoroughly dedicated teacher who truly shone in the teaching laboratory. One year he actually "took" the laboratory component of an elementary physics course, with the aim of being better able to suggest improvements in the course.

At a more advanced level, his careful and meticulous instruction in x-ray methodology gave his students a wealth of research-quality skills and insights.

Much of Chuck's research dealt with the study of the effects of high pressure on the elastic moduli of metals and ionic crystals as a means of elucidating microscopic interatomic interactions. Both the experimental work and its analysis were characterized by the careful and systematic approach he applied to everything he did, and he became an international authority in his field. One very useful publication is his 1958 review of the effects of symmetry on crystal properties, especially the elastic constants.

One paper that had a major impact on our understanding of the electronic properties of the semiconductors germanium and silicon was an exploration of the piezoresistance effect that he carried out during a sabbatical leave at Bell Telephone Laboratories during 1952–53. Chuck found that for both silicon and germanium, one of the shear coefficients was exceptionally large. Chuck's host at Bell, Conyers Herring, quickly realized that these results demonstrated that the effective masses must therefore be anisotropic. This finding immediately explained why a variety of measurements of different transport properties had given different values of the effective mass of the electrons.

Chuck was a well-ordered and clear-thinking person, with little tolerance for sloppiness or irresponsibility. He had a subtle sense of humor and was warm-hearted and always eager to be helpful. He and his wife, Barbara, were avid bridge players and had a deep attachment to the Rhode Island beach cottage they visited each summer.

LAWRENCE SLIFKIN

LAURIE McNEIL

*University of North Carolina at Chapel Hill
Chapel Hill, North Carolina*

Jean-Louis Calais

Jean-Louis Calais of the University of Uppsala (Sweden), died suddenly in Uppsala on 30 May 1995. He was 62 years old.

After attending Sigtunastiftelsens Humanistiska Läroverk, he attended the University of Uppsala, where in

1965 Jean-Louis received two doctoral degrees (PhD and DSc) in quantum chemistry and was named docent in the newly established department of quantum chemistry. He remained at Uppsala as a university lecturer and later as titular professor. He had recently been elected president of the Swedish Physical Society for the period 1995–97.

Jean-Louis was involved in many international collaborations and was one of the founding members of the Quantum Theory Project at the University of Florida, which was established as a sister group to the Uppsala quantum chemistry department in 1960. He maintained close contact and scientific collaboration with the QTP, where he was an adjunct professor. He also had active and long-standing collaborations with groups at the École Normale Supérieure and was involved in two European Union research consortia.

Jean-Louis was active in education at both the graduate and undergraduate levels. For many years he was instrumental in organizing and lecturing in the international summer institutes held in Scandinavia and the corresponding winter institutes in quantum chemistry and solid-state physics held in Florida, at Gainesville.

The electronic structure of materials, in particular crystals and more recently polymers, formed the basis of Jean-Louis's scientific interest. He edited several books and wrote one, and he was editor of the *International Journal of Quantum Chemistry*. His interests spanned many fields, from quantum chemistry to solid-state physics, from materials science to organic chemistry.

Jean-Louis made significant contributions to the theoretical study of polymers. A notable recent contribution was his characterization of convergence criteria for direct self-energy summations in many-body Green's function calculations on such extended systems.

Jean-Louis excelled in understanding the fine details of a problem. His last paper, to appear in the *European Journal of Physics*, exemplifies his attention to detail. The paper gives an erudite explanation of the translational symmetry of many-electron states and unravels the distinction between "translational invariance" and "translational symmetry."

Jean-Louis's interests were catholic. He was interested and knowledgeable in music, art, history, literature and gastronomy. He was a kind, friendly and unfailingly jovial colleague.

YNGVE OHRN

JOHN R. SABIN

*University of Florida
Gainesville, Florida* ■