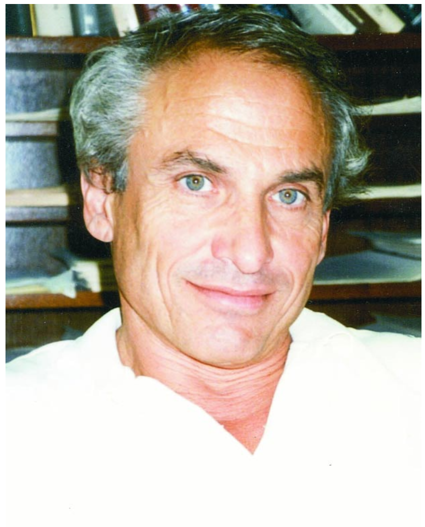
Low, dealt with Regge theory.

In 1973, Adrian moved to the Institute for Advanced Study in Princeton, New Jersey. His entire life as a scientist was characterized by his independence of spirit and unremitting search for truth. This quality was shown at an early stage in his career by his 1974 work on string theory, in which he constructed a bosonic string in noncritical (that is, fewer than 26) dimensions. Although quite prescient, this work perhaps had less impact than it might otherwise have had because "noncritical strings" are technically more complicated than their critical counterparts.

Adrian moved to the University of California, San Diego, in 1975 to take a position as a research associate. In 1977, he became an assistant professor at the University of Arizona, Tucson, where he spent the remainder of his career. As his focus shifted to gauge theories, he worked on classical solutions now called instantons and solitons. From 1977 to 1979, Adrian worked with Eldad Gildener on the contributions of instantons to energy spectra and on the effect of fermions coupled to instantons. Adrian and Gildener published a number of articles that received wide recognition.

At the end of the 1970s, Adrian became intensely concerned about the infrared problems inherent in the semiclassical treatment of instanton gases, both in Yang–Mills theory and its two-dimensional analog, the nonlinear sigma models (classical ferromagnets). His work on these instanton gases with Alain Rouet provided a complete calculation showing that these infrared effects lead to surprising results.

In the early 1980s, Adrian turned to the fundamental question of whether quantum behavior can be understood from something more fundamental. He noted that the assumed equipartition of energy, which in the late 19th century led to the failed attempts to understand blackbody radiation within the classical framework and which led Planck to introduce his quantum hypothesis, was not as well founded as many researchers had believed. Inspired by the seminal study of Enrico Fermi, John Pasta, and Stanislaw Ulam, who were arguably the first to document the failure of equipartition in a nonlinear classical system, Adrian studied a variety of nonlinear systems with potentially infinitely many degrees of freedom and found nonergodic behavior (resulting in violation of equipartition), which, in some cases, led to a Planck-like spectrum. Whether his observation actually could lead to a "classical" foundation for quantum behavior remains an intriguing open question.



ADRIAN NICOLAE PATRASCIOIU

Adrian's earlier work with Rouet on the problematic aspects of the semiclassical approximation led directly to the main research theme of Adrian's later years, during which he questioned the validity of perturbation theory in asymptotically free field theories (four-dimensional Yang–Mills theory and two-dimensional classical ferromagnets with non-abelian symmetry) and hence of asymptotic freedom itself. He began this enterprise in 1984 and was joined in 1987 by one of us (Seiler). They argued that, despite its widespread acceptance, the presence of asymptotic freedom in models with non-abelian symmetry was an unresolved mathematical question. Because the question was central to particle physics (in particular, quantum chromodynamics) and condensed matter physics (low-dimensional ferromagnets), Adrian considered a mathematically rigorous resolution to be of great importance.

Adrian and Seiler used a multipronged attack, analytical as well as numerical, to back their dissident view that the perturbation theory approach, on which asymptotic freedom rests, is mathematically unjustified in those non-abelian models. In the course of their work, they produced a number of new ideas; one of the more interesting was the reduction of the question in the ferromagnetic case to a percolation problem. The percolation approach has proven quite fruitful and has led to some novel rigorous results. The central problem of asymptotic freedom, however, remains mathematically unsolved, although Adrian and Seiler accumulated a large body of evidence supporting their perspective. At the time of his death, Adrian was actively engaged in a number of new projects related to that research theme.

Although Adrian's devotion to his research was passionate, he pursued other interests with almost equal fervor. He brought to those pursuits many of the same traits that marked his physics research. For example, his love of music was intense but idiosyncratic. He prided himself on finding lesser-known gems, such as Bizet's "other" opera, *The Pearlfishers.* This work has since seen renewed public interest, but Adrian was convinced of its merits long before the popular revival. Adrian's passion for sports was equally intense: He was an avid skier, tennis player, and weightlifter. At the same time, he was a warm and generous person, enriched by an impish, ironic, and often self-deprecating humor. He was a devoted family man, and was especially proud of his daughter and son.

Adrian's life and career revolved around his tenacious search for the ultimate physical laws. His uncompromising personal honesty never allowed him to be satisfied with a theory that he did not find compelling, even if the weight of the entire physics community was behind it. His friends and colleagues will warmly remember Adrian as a physicist of the highest scientific integrity.

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Donald Keith Stevens

Donald Keith Stevens, former associate director for basic energy sciences under the Office of Energy Research (now the Office of Science) at the US Department of Energy (DOE), who spent more than 39 years in public service, died on 25 February 2002 in Kensington, Maryland, of natural causes.

Born on 30 July 1922 in Troy, New York, Don earned his bachelor's degree in chemistry at Union College in Schenectady, New York, in 1943.

That year, he joined the Naval Research Laboratory in Washington, DC, as a member of the research staff, working at NRL until 1949. During that period, he also served a brief tour of duty in the US Navy and was assigned by NRL to attend the first reactor school at the Clinton Laboratories (now known as the Oak Ridge National Laboratory). He earned his PhD in physical chemistry, under the guidance of James Crawford, from the University of North Carolina at Chapel Hill in 1953. He performed his thesis research at ORNL's solid-state physics division, where he used magnetic susceptibility techniques to study radiation damage and the effective masses of electrons and holes in semiconductors.

After receiving his doctorate, Don became a staff member of ORNL's solid-state division and continued research related to his thesis work until 1957, when the Atomic Energy Commission (AEC) in Washington requested his services for two years as a staff member of the metallurgy and materials branch. Don contracted a severe case of "Potomac fever," and ultimately succumbed to it by accepting the position of chief of the metallurgy and materials branch. He remained in Washington after that, surviving the first-order phase transformations from the AEC to the Energy Research and Development Administration and then to DOE.

Don was an early champion of the establishment of interdisciplinary materials research laboratory programs at universities. In 1957, he became the AEC representative to the multiagency coordinating committee on materials research and development, which reported under the Federal Council on Science and Technology (FCST) to President Dwight D. Eisenhower's science adviser, James Killian. Don subsequently became chairperson of the committee. At a key 1958 meeting, Don, Willard Libby of the AEC's general advisory committee, and John Kincaid of the Department of Defense's Advanced Research Projects Agency convinced Herbert York, DOD director of defense research and engineering, that Don's investigations under AEC auspices established and documented a great need to create interdisciplinary materials laboratories in universities and to support the creation of buildings to house them.

By the end of the 1960s, the government had established 16 interdisciplinary materials laboratories, 12 of which were sponsored by the DOD


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DONALD KEITH STEVENS

(and subsequently were transferred to NSF), 2 by NASA, and 2 by the AEC. The two AEC-sponsored labs, one at the University of California, Berkeley, and the other at the University of Illinois at Urbana-Champaign, are still supported today by the AEC's successor agency, DOE, under what are presently called the Lawrence Berkeley National Laboratory and the Frederick Seitz Materials Research Laboratory, respectively.

Many of Don's contributions to the American scientific enterprise are legendary. He played a major role in the establishment of world-class scientific user facilities for x-ray synchrotron radiation, neutron sources for neutron scattering, and electron beam microcharacterization centers that are now used by 8000 scientists annually. These facilities include the National Synchrotron Light Source at Brookhaven National Laboratory (the accompanying photograph of Don was taken at the dedication of the NSLS in 1982); LBNL's Advanced Light Source; ORNL's High Flux Isotope Reactor; the Advanced Photon Source and the Intense Pulsed Neutron Source at Argonne National Laboratory; and the now closed High Flux Breeder Reactor at Brookhaven.

Don also was involved in the celebrated 1984 National Research Council report, written by a committee chaired by Frederick Seitz and Dean Eastman, that clearly set forth the national need, and paved the way, for the construction of the Advanced Light Source, Advanced Photon Source, and ultimately the Spallation Neutron Source, currently under construction at ORNL. This report also suggested new capabilities at then existing facilities such as centers for cold neutron research, insertion devices on existing synchrotron radiation facilities, and an experimental hall and instrumentation at Los Alamos Neutron Scattering Center at Los Alamos National Laboratory, all of which have now been achieved. He played a lead role in promoting scientific interactions with synchrotron facilities in the former USSR and the People's Republic of China, and established the US–Japan scientific program exchange on neutron scattering.

In 1985, as the new associate director for basic energy sciences, Don began building a cutting-edge program that advanced the frontier of understanding. He knew that the scientific discovery process involved probing the unknown and that genuine scientific discovery, by its nature, required a willingness to underwrite risk-taking endeavors for which certain results could not be predicted in advance. When aspiring investigators who wanted funds would tell Don that they knew they could deliver a particular product or result within three or any number of years, Don understood that any such possible results would be of no more than mediocre value, and he would not provide funds. His philosophy of managing research was to fund the right people and not try to micromanage them from Washington. The choice of programs that he did fund has led to six Nobel Prizes, and because many of the programs that he initiated are still under way, this impressive list might yet experience further growth.

Don was a superb manager of science and engineering programs. For many years, and despite many changes on the federal scene, he served both the government and the national scientific enterprise. His masterful absorption or deflection of bureaucratic noise permitted investigators to accomplish more and the government to get more for the public's money.

Don had the rare quality of knowing both who he was and what authority he had and, simultaneously, of treating his subordinates as equals. He was outspoken in his views but always willing to listen to equally outspoken opinions from his subordinates. Most of all, he was never remote from the scientific community that he served so well.

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