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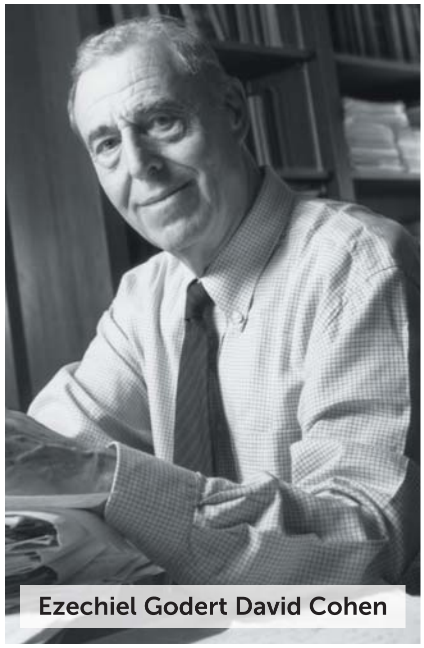
Ezechiel Godert David Cohen

Ezechiel Godert David "Eddie" Cohen passed away on 24 September 2017. He was a professor at the Rockefeller University from 1963 until his retirement in 1993, but he remained scientifically active until a few months before his death. With H. Eugene Stanley, Eddie was awarded a 2004 Boltzmann Medal by the International Union of Pure and Applied Physics; Eddie's was given "for his fundamental contributions to nonequilibrium statistical mechanics, including the development of a theory of transport phenomena in dense gases, and the characterization of measures and fluctuations in nonequilibrium stationary states."

Eddie was born into a Jewish family in Amsterdam on 16 January 1923. The family was forced to go into hiding and was separated in 1942 during the German occupation of the Netherlands. Eddie escaped the fate of his parents, who were betrayed and perished in Auschwitz. He received his undergraduate degree in 1952 and his PhD in theoretical physics, under the direction of Jan de Boer, in 1957, both from the University of Amsterdam. After postdoctoral appointments at the University of Michigan with George Uhlenbeck and at Johns Hopkins University with Theodore Berlin, he joined the faculty of theoretical physics at the University of Amsterdam. In 1963 he accepted a professorship at the Rockefeller University, joining a group that included Uhlenbeck, Mark Kac, and Abraham Pais.

THE ROCKEFELLER UNIVERSITY



Ezechiel Godert David Cohen

Eddie's early scientific accomplishments included, with J. M. J. van Leeuwen, one of the first studies of the phase separations in helium isotope mixtures at low temperatures, important for helium dilution refrigerators. With one of us (Dorfman), he discovered divergences in the virial expansion of transport coefficients; that discovery caused a revolution in nonequilibrium statistical physics and provided a kinetic-theory explanation of the algebraic time decays that Berni Alder and Thomas Wainwright found in the Green–Kubo time-correlation functions of moderately dense gases.

Working with numerous students, postdocs, and visiting scientists, Eddie made many important contributions to nonequilibrium statistical physics. Among them was a deep study of the long- and short-wavelength behavior of microscopic hydrodynamic modes in dense hard-sphere fluids, important for understanding phenomena seen in neutron-scattering experiments and in studies of time-correlation functions in dense fluids.

Eddie's research on fluids maintained in a nonequilibrium stationary state (NESS) produced some striking results. In particular, he and another of us (Kirkpatrick), then his graduate student, showed that the intensity of the central peak in the spectrum of light scattered by a fluid with a stationary temperature gradient is orders of magnitude larger than the corresponding intensity in an identical fluid in equilibrium. That prediction has been verified experimentally by the other of us (Sengers) and coworkers. With Denis Evans and Gary Morriss, Eddie studied the Lyapunov exponents for a system of particles kept in a NESS with a thermostat that maintains a constant internal energy. Analyzing such systems led him, in collaboration with Giovanni Gallavotti, to develop what is now known as the Gallavotti–Cohen fluctuation theorem.

Eddie's contributions to science went far beyond his research and publications. He was devoted to physics and was passionate about everything he encountered both in his own work and in that of others. That passion made him an excellent mentor to scientists in the early stages of their careers. Those of us who worked with him—colleagues, students, and postdocs—can still hear Eddie's voice commenting on our taste in the problems we chose, the need for careful and critical thinking, and the necessity of questioning the correctness and even the relevance of every phase of our research.

Eddie was invaluable at lectures, conferences, and meetings. His questions, sometimes numerous, were insightful and penetrating. Speakers would often learn something beneficial to their work, such as suggestions for new ideas and directions to consider, when questioned by Eddie.

The community of statistical physicists was greatly enriched by Eddie's service to it. He organized a summer school that focused on fundamental problems in statistical physics, and he edited the proceedings into an ongoing series of books. The school, which Eddie started in the Netherlands in 1961, was

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Predhiman Krishan Kaw
15 January 1948 – 18 June 2017

later expanded across Europe and is still held every few years, most recently in Italy in 2017. His papers and articles surveying various aspects of research and problems in kinetic theory and nonequilibrium statistical mechanics were clearly written and widely read.

Together with his other students, postdocs, and collaborators, we are grateful for the scientific mentorship we received from Eddie Cohen.

J. Robert Dorfman
Ted R. Kirkpatrick
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Richard Edward Taylor

On 22 February 2018, Canadian-born physicist Richard Edward Taylor, Nobel laureate and Stanford University professor emeritus, passed away at his home on the Stanford campus. He shared the 1990 Nobel Prize in Physics with Jerome Friedman and Henry Kendall of MIT for their groundbreaking experiments in deep inelastic electron scattering, work that led to the development of the quark model.

Following their studies of elastic scattering of electrons from protons at SLAC in the late 1960s, Taylor and his research team and Friedman, Kendall, and their MIT group turned to studies of deep inelastic scattering. But they were not encouraged by recent literature on proton structure because little of that theoretical work mentioned inelastic results. Taylor and colleagues' initial research, however, showed unexpectedly large cross sections, and they and others considered early on the possibility of constituents inside the proton.

Taylor and his team observed in their data a simplifying feature, so-called Bjorken scaling, but they did not clearly understand its significance. Richard Feynman, with his parton model, explained scaling in terms of scattering from constituents. However, other scientists suggested that the data could be explained by nonconstituent models involving the strong interactions. It took considerably more experimental and theoretical work to resolve the issues. Eventually those efforts—further inelastic measurements, including of electron–neutron inelastic scattering; sum rules from electron and neutrino inelastic scattering; the development of quantum chromodynamics; and the discovery of charm—all pointed toward quarks as the constituent partons.

Taylor was born on 2 November 1929 in Medicine Hat, Alberta, Canada, and went to the University of Alberta, where he earned an MS degree in 1952. He then went to Stanford and entered the physics graduate program. In 1958 he was invited by colleagues at École Normale Supérieure in Orsay, France, to work on experiments for their new accelerator at the Laboratoire de l'Accélérateur Linéaire. After three years Taylor returned to the US to work at the Lawrence Radiation Laboratory. He went back to Stanford in 1962 to complete his PhD under adviser Robert Mozley.

Shortly afterwards, Taylor went to work at SLAC, which was under construction. He soon found himself being asked to manage the construction of the spectrometers and the experimental hall, known as End Station A, that would contain them. In his Nobel lecture, Taylor said, "This was not an enviable position, since there was little agreement about what should be done, and most of the people involved clearly outranked me." Ultimately, three spectrometers were built; the sizes—1.6, 8, and 20 GeV/*c*—covered the possible range of momenta of interest. Taylor heavily influenced the resulting design of the End Station facility and the spectrometers.

TOM NAKASHIMA, SLAC

Richard Edward Taylor

As the accelerator was being completed, Taylor formed one of SLAC's experimental groups, named simply Group A, and began collaborating with MIT and Caltech groups on elastic electron-scattering experiments. Following those experiments, the Caltech team departed to work on other activities, and the SLAC and MIT groups turned to deep inelastic scattering experiments. Following the initial inelastic studies, Group A and the MIT group continued separately to explore the inelastic spectrum and used the spectrometers designed for that purpose.

Using a beam of polarized electrons at high energy at SLAC, Taylor and collaborators in 1978 conclusively demonstrated parity nonconservation in deep inelastic scattering from deuterium. A 1967 theoretical paper by Steven Weinberg entitled "A model of leptons" had implied that result, which supported unification of the electromagnetic and weak forces into a single electroweak force. Recognizing the importance of the result and the existing extensive body of experimental and theoretical work, the Nobel Committee awarded the 1979 Nobel Prize in Physics to Sheldon Glashow, Abdus Salam, and Weinberg for their contributions to what is now known as the standard model. It took the committee 11 more years to honor the initial deep inelastic scattering experiments that first led to our current understanding. A year before receiving the Nobel, Taylor, Kendall, and Friedman were awarded the W. K. H. Panofsky Prize in Experimental Particle Physics from the American Physical Society.

Taylor influenced many who collaborated with him when he was leader of SLAC's Group A. He supported young physicists in numerous ways: He pushed aside barriers for them, opened doors in their fledgling careers, and shared thoughtful advice, wisdom, and helpful criticisms. Group A was also the temporary home for European visitors, many of whom rose to important positions in the European physics community. The group was Taylor's home and family for the physics side of his life. He will be remembered as a bigger-than-life figure in the histories of SLAC and of particle physics.

Charles Prescott
Martin Breidenbach
SLAC National Accelerator Laboratory
Stanford, California PT