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Obituary

Joel Henry Ferziger

Joel H. Ferziger was born on 24 March 1937, in Brooklyn, N.Y. A professor emeritus of mechanical engineering at Stanford University and an internationally recognized authority in the field of thermodynamics and fluid mechanics, Joel died of pancreatic cancer at Stanford University Hospital on 16 August 2004.

After entering the Cooper Union in New York at the tender age of 16 to study chemical engineering, Joel was awarded a National Science Foundation Graduate fellowship to pursue graduate work in the nuclear engineering program at the University of Michigan. He earned a master's degree in 1959, and then a doctorate in 1962 for his dissertation on 'The Theory of Neutron Slowing Down in Nuclear Reactors'. Joel and his doctoral advisor, Prof. P. F. Zweifel, turned the dissertation into a book in 1966.

Joel became a member of the Stanford University faculty in 1961 at the age of 24 and remained at Stanford for the next 43 years in what he described as the perfect job for him. At his retirement party in April 2004, Ferziger paid special tribute to Stanford. 'This has been my dream job for 43 years', he told his colleagues. 'I cannot imagine wanting to do anything else. If I were independently wealthy, I probably would have done it for free.'

During the first decade of his career, Joel rose to prominence in the areas of neutron transport theory and radiation transport theory and their application. In 1972, he wrote *Mathematical Theory of Transport Processes in Gases* with H.G. Kaper.

In the 1970s, Joel turned his attention to computational fluid dynamics and turbulence. He became internationally known for his innovative work in developing computer simulations to model complex turbulent flows. A self-described 'numerical experimentalist', he believed, and taught, that to do computer simulations rigorously, it is also necessary to develop new numerical methods. With William C. Reynolds, Joel pioneered the large-eddy simulation (LES) method, which made computation of turbulent flows at large Reynolds numbers possible. Much of his research focused on developing the theoretical underpinnings and the sub-grid scale closure models so critical to the success of this approach. His work with Reynolds and J. Bardina led to a completely new approach to the modeling of the sub-grid-scale motions; their scale-similarity model is the underpinning of virtually all modern closure models. In addition, Joel's work has contributed greatly to advances in aircraft engine design and combustion.

Ferziger received numerous honors. He was a Fulbright Fellow in the Netherlands from 1967 to 1968, was a visiting professor at Queen Mary College in London in 1979, and received the Alexander von Humboldt Award in 1987 and a Max Planck Research Prize in 1991.

Over the course of his career, Ferziger wrote more than 100 archival journal articles and several textbooks, including *Computational Methods for Fluid Dynamics* published in 1996

and coauthored by Milovan Peric. The first and second editions of his *Numerical Methods for Engineering Applications*, Wiley Inter-Science, is likely to be found on the desktop or in the bookshelf of most engineering faculty and students who do any numerical work at all. Indeed, students from all over the world continue to write to seek his assistance on numerical issues they have encountered during the course of their research. Joel's course on numerical methods at Stanford was one of the most popular courses, not only for mechanical engineering students but also for students from other engineering disciplines.

In addition to his contributions to engineering, Joel was known for his great passion for both gourmet cooking and for wine, and in hosting frequent dinner parties and wine-tastings for his students, family, and friends. He loved to travel, visiting and exploring numerous countries, but he had a special 'soft-spot' for Paris where he lived and visited as often as his schedule would allow. He was devoted to his family—his wife Eva, his daughters, and his beloved grandchildren.

Those of us who knew and worked with Joel could not help but be inspired by his remarkable joie de vivre, which defined him even more so than his significant contributions to science. We have lost not only a valued colleague, but also a dear friend who will be sorely missed.

JOHN KIM
Department of Mechanical and Aerospace Engineering
University of California
Los Angeles, CA
E-mail: jkim@seas.ucla.edu

JEFFREY R. KOSEFF
Stanford Institute for the Environment and
Departments of Civil and Environmental Engineering and
Chemical Engineering (by courtesy)
Stanford University
Stanford, CA
E-mail: koseff@stanford.edu

ANTHONY LEONARD
California Institute of Technology
Pasadena, CA
E-mail: tony@galcit.caltech.edu

ROBERT L. STREET
Departments of Civil and Environmental Engineering
and Mechanichal Engineering (by courtesy)
Environmental Fluid Mechanics Laboratory
Stanford University
Stanford, CA
E-mail: street@stanford.edu

