THE JOURNAL OF PHYSICAL CHEMISTRY A


VOLUME 106, NUMBER 45, NOVEMBER 14, 2002

# Biography of R. Stephen Berry

This Special Issue of *The Journal of Physical Chemistry A* celebrates the contributions of our friend and colleague R. Stephen Berry. We say "our friend and colleague" because Steve's research and its implementations have been very broad. That research has involved many colleagues in many countries, and it has influenced a variety of fields of chemistry as well as aspects of public policy. The contributions to this issue can give only a hint concerning Steve Berry's overall impact on our world.

Steve is the James Franck Distinguished Service Professor Emeritus at The University of Chicago. Born in Denver, Colorado, in 1931, he entered Harvard University in 1948, having been a finalist in the Westinghouse Science Talent Search of that year. Steve received all of his formal education at Harvard: an AB in 1952, an AM in 1954 and a PhD in 1956. His dissertation research dealt with the electronic structure of butadiene; William Moffitt was his thesis advisor. Steve's first academic appointment was as an Instructor of Chemistry at Harvard. He held that position for 18 months, then moved, in 1957, to the University of Michigan as an Instructor of Chemistry. After three years at Michigan he moved to Yale University, in 1960, as an Assistant professor of Chemistry. Steve's stay at Yale was short; in 1964 he moved to The University of Chicago as an Associate Professor of Chemistry, where has remained. He was promoted to Professor of Chemistry in 1967, and then awarded the James Franck Distinguished Service Professorship in 1989. Since arriving in Chicago he has been an active member of the Chemistry Department, The James Franck Institute and, beginning in 1975, the Committee on Public Policy Studies.

Steve's experimental and theoretical research has had a major influence on many fields of modern chemistry. He carried out pioneering, high-resolution, spectroscopic measurements of atomic electron affinities. At about the same time he advanced the first description of the properties of nonrigid molecules and their rearrangement, a mechanism now known as the Berry pseudorotation. His seminal research on radiationless processes led to the prediction of the phenomenon of

10.1021/jp0219552 CCC: $22.00 
Published on Web 09/21/2002

molecular quantum beats, a quantum interference effect which was later experimentally observed. This research provided the basis for the still evolving study of molecular wave packet dynamics using femtosecond spectroscopy. Later work on molecular structure and spectra led to the first observation of transient reaction intermediates of radicals, such as benzynes and naphthalynes. Steve has made centrally important contributions to the understanding of structural transitions in molecular clusters, and how they differ from those in bulk materials. This research helped define the conceptual framework for the description of clusters and nanoparticles in terms of the properties of their potential energy surfaces, relating topographies and topologies of the energy landscapes to structure seeking and glass forming tendencies. His most recent work has advanced an innovative approach to the description of the dynamics of protein folding and the identification of the preferred folded structure.

Steve has also made groundbreaking contributions to the theory of thermodynamic processes taking place with nonzero rates. The thermodynamic descriptions of chemical, physical, and biological phenomena are commonly based on highly idealized and often unrealistic models that utilize limiting processes that take place with zero rates. Steve initiated explorations of a new class of analyses of macroscopic processes, stimulating the development of the field now known as finite time thermodynamics. His work provided a new set of tools for the identification of ways and means to improve energy efficiency of macroscopic thermal processes, with attention to proper design of the systems intended to carry out those processes.

Motivated by what he perceived to be the social obligations of the scientific community, Steve has addressed the causes of air and water pollution. He has developed thermodynamic and other analyses of atmospheric pollution, life cycling of manufactured materials and generalized methods for the assessment, control, and assimilation of technology, all of which have become standard techniques. He is active in the field of electronic exchange of scientific information, and scientific intellectual property; his work has influenced the policy concerning openness and availability of scientific data.

Approximately 130 scientists have benefited from his mentoring as research supervisor (69 graduate students, 39 postdoctoral fellows, and about 20 undergraduate students). His publications include collaborations with 48 senior colleagues from all over the world. We can personally attest to the benefits and great pleasure of our collaboration with Steve, and we are confident that others will similarly testify.

Because of the scope of his research and the results thereof, we believe that Steve is one of the most influential chemists of his generation. His work has had, and continues to have, great influence on the development of chemistry and related areas of science. It is certainly not surprising that Steve has been recognized with many awards for his contributions. These include election to Fellowship of the National Academy of Sciences, the American Academy of Sciences and the Royal Danish Academy of Sciences. He is currently the Home Secretary of the National Academy of Sciences. In 1986–1987, Steve was the Newton-Abraham Professor at Oxford University. He has been an Alfred P. Sloan Fellow (1968), a Guggenheim Fellow (1976–78), a MacArthur Prize Fellow (1983–1988), and a Fellow of the Japan Society for the Promotion of Science (1984). In addition, he has held numerous distinguished lectureships at universities in the United States and abroad. Scientists are fortunate to be able to combine their avocation and their vocation. Steve Berry has shown how fruitful that combination can be.

**Stuart A. Rice**
**Joshua Jortner**

*Guest Editors*