

R. Srinivasan Makes a Move



Dr. R. Srinivasan retired last year, at the age of 61, from his position as Manager (Photochemistry) at the IBM Thomas J. Watson Research Center. He will devote his attention to managing his own company UVTech Associates, Inc., which he started just over a year ago in order to continue his pioneering work in laser ablation technology. The occasion of his retirement gives us a chance to reflect on his career and numerous contributions to the field of photochemistry.

Rangaswamy Srinivasan was born in Madras, India on February 28, 1929. He received his B.Sc. (Honours) from the University of Madras in 1949, and his M.S. a year later from the same institution. He then moved to the U.S. to do further graduate work with Sidney Benson at the University of Southern California, and received his Ph.D. degree in 1956. It was during this time that his interest in photochemistry began, although the major thrust of his Ph.D. work was in protein physical chemistry, a field in which

he continued to work during a two-year post-doctoral fellowship with Linus Pauling at the California Institute of Technology. He then took up a Research Fellowship with W. A. Noyes, Jr. at the University of Rochester. Sri's association with Noyes is perhaps not widely known, as only one paper was published as a result of the collaboration. He did manage, however, to publish his first fifteen independent photochemistry papers (13 of them as the sole author) during this period. He joined IBM as a Research Staff Member at the Thomas J. Watson Research Center in Yorktown Heights, N.Y. in 1961, and was promoted to the level of Manager in 1964. He took a leave of absence from IBM in 1966 in order to try his hand at academia, accepting a position as Associate Professor of Chemistry at Ohio State University. Though he was quickly promoted to the rank of Professor, he returned to IBM in 1967 and has remained there until his retirement.

Repeatedly during his career and throughout his over 200 publications, Sri has demonstrated the remarkable sense of foresight that has earned him a place as one of the true pioneers of photochemistry. As a consequence of his training as a gas-phase physical chemist, his work at Rochester and IBM throughout the 1960's and early '70's focussed on the gas-phase. He contributed substantially to the development of many of the most fundamental organic photoreactions, such as the Norrish Type I and II reactions of alkanones, photoisomerizations of conjugated dienes and trienes, and intramolecular 2+2 cycloaddition reactions of non-conjugated dienes and enones. His best-known contributions from this period include the demonstration of the involvement of acetone enol in the Norris II cleavage of 2-hexanone in 1959, the syntheses of strained bicyclic hydrocarbons from Norris I cleavage of bicyclic ketones, and his numerous papers on the mercury-photosensitized intramolecular cycloadditions of dienes. In the early 1970's his attention shifted to the condensed phase with his seminal contributions in arene-alkene photocycloadditions and, in a more applied area, the discovery of several of the short-wavelength (400-460 nm) laser dyes which are still in use today. He is credited with the first demonstration of the stereochemistry of the photochemical ring-closure of conjugated dienes to cyclobutenes. Throughout the 60's and 70's, he maintained a secondary interest in gas-phase thermal

isomerizations of strained hydrocarbons. His several important contributions in this area include studies of the thermal rearrangements of cyclobutanes, cyclopropenes and cyclobutenes.

In the late 1970's, he shifted his attention to developing simple, yet revolutionary techniques for the study of the photochemistry of "non-absorbing" (beyond 200 nm) organic molecules in solution. The first paper in his well-known series "Organic Photochemistry with 6.7 eV Photons" appeared in 1977, co-authored with his wife (since 1983), Karen H. Brown. Over the period 1977-83, he published some two dozen papers in this series, on the far-uv (185 nm) photochemistry of small organic molecules such as alkenes, cyclopropanes, and non-conjugated dienes and enones in solution.

His most recent, and arguably most important, contributions were spawned from this work. Early in 1981 he took delivery of his first excimer laser, which he planned to exploit as a monochromatic source of far-uv radiation for small molecule photochemistry. Shortly after the new laser was first turned on, he discovered (or more precisely, "experienced") the intense cold flame that emits from polymeric materials when irradiated with the focussed beam. After several further experiments with his thumb-nail, he turned to more conventional polymers, and ablative photodecomposition ("APD") was born. Since the first report in 1982, he has published well over sixty papers and holds seven patents on the mechanism and use of APD in the controlled etching of polymer surfaces and in medical applications. His discovery has led to an enormous volume of fundamental research in chemistry, physics, engineering, and medicine from laboratories around the world. APD is now used routinely in medicine for performing precise surgery on the cornea and in arteries, and new applications for the technique continue to appear almost weekly.

Srinivasan has made many other contributions to the development of photochemistry. He has supervised numerous postdoctoral fellows and students throughout the course of his career, and has served as a Visiting Professor at the City University of New York, the Columbia-Presbyterian Medical Center, and the Harvard

Medical School. He is a member of the Editorial Advisory Board of a number of journals, has published numerous reviews and monographs, and is Editor of the very useful two volumes of "Photochemical Organic Synthesis". He has chaired numerous photochemistry meetings, and has been a member of the organizing committee for the International Conferences on Photochemistry since 1971. He served as Secretary of the Inter-American Photochemical Society in the early 1980's. Sri's achievements have been recognized; he was a Guggenheim Fellow in 1965-66 and is a Fellow of the American Physical Society, the New York Academy of Sciences, the American Association for the Advancement of Science, and the American Society of Laser Medicine and Surgery. IBM has awarded him no less than ten Outstanding Innovation Awards since 1969. One of his more commonly known inventions is the "Rayonet Photochemical Reactor" which he

invented during his post-doctoral years at Rochester.

Sri is also well-known for his longest-standing hobby - wine. One of the highlights of the Organic Photochemistry Gordon Conference, when Sri attends, is the mad scurry that occurs at the beginning of the lobster dinner as at least two dozen photochemists vie for the ten or so seats at his table, in order that they might sample the bottle that he invariably smuggles in under his jacket.

While a stage in his professional career has come to an end, Srinivasan's contributions to photochemistry and technology will undoubtedly continue for years to come. I wish him every success and pleasure in his "retirement".

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