2005 Esselen Award Winner

JEAN M. J. FRÉCHET

University of California – Berkeley

Jean Fréchet received his first university degree in Lyon, France in 1967. He received Ph.D. degrees from SUNY and Syracuse Universities in 1971 for his work on oligosaccharides with Professor Conrad Schuerch. He was a member of the chemistry faculty at the University of Ottawa from 1973 to 1987 and, during this time, was a Visiting Scientist at the IBM Research Laboratory in San Jose, CA. In 1987, he joined the Department of Chemistry at Cornell University, first as the IBM Professor of Polymer Chemistry and later as the first holder of the Peter J. Debye Chair of Chemistry at Cornell. Professor Fréchet moved to the University of California Berkeley in 1996 where he holds the Rapoport Chair of Organic Chemistry and heads the Materials Synthesis Program at the Lawrence Berkeley National Laboratory.

Among the honors and awards he has received are honorary doctorates from the University of Ottawa and from the University of Lyon I, the Kosar Memorial Award from the Society of Imaging Science and Technology, and the IUPAC Canadian National Committee Award. Within the American Chemical Society he has received the 2001 Salute to Excellence Award, a Cope Scholar Award, the ACS Award in Polymer Chemistry, the ACS Award in Applied Polymer Science, the Cooperative Research Award in Polymer Science, and the Doolittle Award in Polymer Materials Science & Engineering. Professor Fréchet has been elected to the National Academy of Sciences and the National Academy of Engineering as well as elected fellow of the AAAS, the PMSE Division of the ACS, and the American Academy of Art and Sciences.

His research at the interface of organic, biological and materials chemistry is directed towards functional polymers, their design, synthesis, and applications. His work includes both fundamental and mission-oriented studies with targets such as the control of macromolecular architecture, the establishment of structure-activity relationships, the design of macromolecules for catalysis, energy harvesting and conversion, therapeutic applications, separation and microfluidic media, and nanolithography. At the University of Ottawa in 1973 he started a research program aimed at the development of functional polymers as reagents and supports for solid-phase syntheses. These synthetic approaches became widely used nearly two decades later with the advent of combinatorial chemistry. The concept of chemical amplification used today for the microlithographic fabrication of nearly all state-of-the-art microelectronic devices emerged from his 1979 work in collaboration with C. G. Willson of the IBM Research Laboratory on functional polymers as photoresists. His approach to precise biocompatible dendritic carriers for the targeted delivery of anticancer drugs has been licensed and is under consideration for commercial development.