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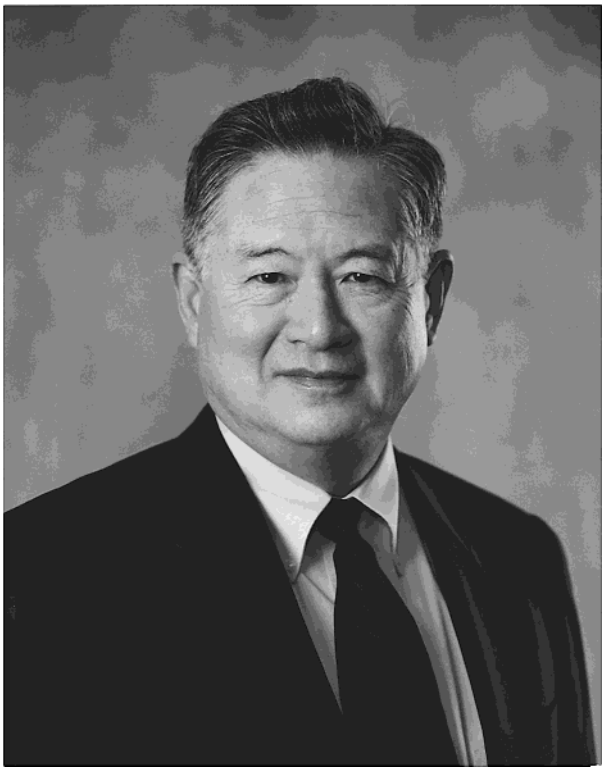
# Benjamin Chu



On December 13−14, 2001, a special Stony Brook Symposium on Complex Matter was held at Stony Brook to celebrate the 70th birthday of Benjamin Chu, Distinguished Professor in the State University of New York at Stony Brook. Over 100 eminent scientists from around the world attended this symposium to recognize his significant contributions to the fields of polymer science and complex matter. The symposium comprised three main subjects: nanoscale characterization, phase transitions, and supramolecular structure, which coincide with his distinguished research efforts over 4 decades.

Benjamin Chu was born in China and received his high school education in Shanghai and Hong Kong. In 1953, he came to the United States, at the age of 21, to enter St. Norbert College on a full scholarship. From February 1953 to October 1958, he completed both his undergraduate and graduate education with a B.Sc., magna cum laude, from St. Norbert College in DePere, WI, and a Ph.D. in radiochemistry from Cornell University. Subsequently, he spent 4 years as a postdoctoral researcher with the late Nobelist Peter J. W. Debye, from whom he learned light scattering. In 1962, he moved as an Assistant Professor to the University of Kansas where he continued his studies of second-order phase transitions using visible light and X-rays. He was promoted to Associate Professor in 1965 and to Full Professor in 1968 when he moved to Stony Brook. Between 1978 and 1985, he served as the Chairman of the Chemistry Department at Stony Brook. He was promoted to Leading Professor in 1982 and Distinguished Professor in 1992. At Stony Brook, he also holds a joint position in the Department of Materials Science and Engineering and an affiliated position in the Department of Biomedical Engineering.

The early work of Benjamin Chu was on critical opalescence with the first determination of Ising critical exponents in binary fluid mixtures.[1] His interest in scattering continued with his pioneering development of the dynamic light scattering technique. His book *Laser Light Scattering* has been a "bible" for the field.[2] He has been instrumental in establishing the light scattering technique to its present status as a routine analytical tool for chemistry and physics. He has also promoted this technique in many emerging fields of science and engineering, including its use in the International Space Station. With the light scattering technique, Benjamin Chu has accomplished a number of truly remarkable works. His studies, including the determination of critical exponents in binary fluid mixtures,[1] the kinetic approach to single polymer chain collapse,[3] and the absolute molecular weight determination of Teflon[4] as well as of Kevlar,[5] are recognized landmarks in laser light scattering applications. The Teflon work is particularly noteworthy, as more than 50 years after its invention, this intractable material has finally been characterized. His Teflon solution work has been extended to the viscosity determination of Teflon melts[6] and has established the methodology to characterize many intractable polymers of industrial importance. Recently, he has demonstrated the application of light scattering to complex fluids and biological systems. His study on the supramolecular formation of block copolymers has led to the new development of a more efficient separation medium[7,8] for DNA capillary electrophoresis. His most recent work dealing with the characterization of a new class of fullerene-based vesicles and membranes[9] has been featured in NEWS OF THE WEEK as well as in CHEMISTRY HIGHLIGHTS 2001 in *Chemical & Engineering News*.[10]

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He has remained a foremost authority in the field of scattering. In the past decades, he has pioneered the development and operation of several beam lines (X3A2, X27C, and ID15) at both the National Synchrotron Light Source (NSLS), Brookhaven National Laboratory, and the Advanced Photon Source (APS), Argonne National Laboratory. In collaboration with Ben Hsiao, the Advanced Polymers Beamline (X27C) at the NSLS developed under his guidance is particularly noteworthy. This beamline is the first synchrotron facility in the United States dedicated to chemistry/materials research (with emphasis on polymers) using combined small-angle X-ray scattering (SAXS) and wide-angle X-ray diffraction (WAXD) techniques.[11] Today, this facility has become a major workhorse serving the U.S. polymer community for time-resolved and in-situ X-ray scattering and diffraction studies. More than 250 researchers from 51 research institutes (university, government, and industry) have carried out experiments at the X27C beamline in the first 3 years of the beamline operation. With synchrotron X-ray scattering, he has extended simultaneous length scale measurements ranging from nanometers to micrometers in his recent research. The consequence of his experimental achievements has permitted in-depth investigations on the structure and dynamics of polymer solutions[12] and blends,[13] self-assembly of block copolymers in selective solvents,[14] and supramolecular formation of polyelectrolyte/surfactant complexes.[15] His passion for science and technology has driven him to publish over 450 scientific papers, 6 books, and 7 patents, with many more pending.

In his career, Benjamin Chu has received many distinguished honors and awards. He was an Alfred P. Sloan Fellow in 1966, a Guggenheim Fellow in 1968, a Fellow and Visiting Professor of the Japan Society for the Promotion of Science in 1975 and 1992, and a Humboldt Awardee for Senior U.S. Scientists in 1976. He is a Fellow of the American Physical Society and an Honorary Professor of the Chinese Academy of Sciences, of Nankai University, and of Xiamen University, all of the People's Republic of China. In 1993, he received the High Polymer Physics Prize from the American Physical Society. In 1994, he was the Langmuir Distinguished Lecturer sponsored by the Division of Colloid and Surface Science of the American Chemical Society. In 1997, he received the Award for Distinguished Service in Advancement of Polymer Science from the Society of Polymer Science, Japan. In 1998, he received the Outstanding Achievement Award of Chinese Institute of Engineers/USA.

Ben, as all his friends call him, has a truly international spirit. He supervised more than 40 graduate students and worked with over 60 postdoctoral associates and visiting scientists from all over the world. He has collaborated with the most distinguished scientists from the Far East, Europe, Russia, Mexico, and Canada. He has not only been a wonderful mentor but his demand for excellence in science has created an era of outstanding scientists. Even though we now celebrate his 70th birthday, he is even more driven than before. However, he also enjoys traveling with his wife Louisa. They both appreciate natural beauty and fine dining around the globe. When not working or traveling, he spends his time visiting his three children and six young and lively grandchildren. There is no doubt that Ben will continue to contribute significantly to the field of polymer science with grace, intelligence, and enthusiasm.

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**Benjamin S. Hsiao**
*Department of Chemistry, State University of New York at Stony Brook, Stony Brook, New York 11793-3400*
**Stephen Z. D. Cheng**
*Department of Polymer Science, The University of Akron, Akron, Ohio 44325-3909*
**Charles C. Han**
*Polymers Division, National Institute of Standards and Technology, Gaithersburg, Maryland 20899*
**Chi Wu**
*Department of Chemistry, The Chinese University of Hong Kong, Shatin, NT, Hong Kong*
MA011994W