

## **Malcolm D. Shuster**

### **Biography**

Malcolm D. Shuster was born in Boston, Massachusetts, on July 31, 1943, and spent his formative years in Revere, Massachusetts. From 1961 until 1965 he was a Physics major at the Massachusetts Institute of Technology (S.B., 1965), after which he did graduate work in Physics at the University of Maryland, receiving the Ph.D. in 1971. He received a master's degree in Electrical Engineering (cum laude) from The Johns Hopkins University in 1982.

From 1970 until 1977 he pursued an academic career in Physics, holding positions with the Center for Nuclear Studies (Saclay, France), the University of Karlsruhe (Karlsruhe, West Germany), Tel-Aviv University (Tel-Aviv, Israel), and Carnegie-Mellon University (Pittsburgh, Pennsylvania). He taught Physics courses at all levels and carried out research on the interaction of elementary particles with nuclei. Many of his Physics papers continue to be cited.

In 1977 he joined the Attitude Systems Operation of the Computer Sciences Corporation in Silver Spring, Maryland, and began a career in Aerospace. At CSC he developed the QUEST algorithm for three-axis attitude estimation and began (with F. Landis Markley) to develop the now standard implementation of the Kalman filter for spacecraft attitude estimation. Beginning in 1981 he spent seven years at Business and Technological Systems, Inc., Seabrook and Laurel, Maryland, working mostly on problems of submarine-launched ballistic missile systems, estimation for Geophysical systems, and occasionally on spacecraft attitude estimation. He joined the Space Department of The Johns Hopkins University Applied Physics Laboratory in 1987 and began working on problems of spacecraft attitude estimation with greater intensity. From 1994 until 1999 he was professor of Aerospace Engineering, Mechanics and Engineering Science at the University of Florida, Gainesville, Florida. He was with the Orbital Sciences Corporation in Germantown, Maryland, from 1999 to 2001. Due to a succession of illnesses he essentially stopped working in the summer of 1999, and ceased to have even a formal employer in 2001. Since 2001 he has been publishing earlier work under the fictitious banner of the Acme Spacecraft Company, of which he has styled himself Director of Research.

He is the author or coauthor of approximately fifty journal articles on Physics and Astronautics, many of which have become key papers, an equal number of conference papers, and has supported twenty spacecraft. He is a fellow of the American Astronautical Society (AAS), an associate fellow of the American Institute for Aeronautics and Astronautics (AIAA), and a senior member of the Institute for Electrical and Electronics Engineers (IEEE). He has been a member of the American Physical Society and the Society for Industrial and Applied Mathematics (SIAM), and a fellow of the British Interplanetary Society. He has served as general co-chairman or technical co-chairman of several IEEE, AIAA and AAS conferences and symposia. He has been a guest editor of a special issue of the Journal of the Astronautical Sciences and a member, since its inception, of the advisory board of the Space Technology Library, published now by Springer Scientific and Business Media. In 2000 he received the Dirk Brouwer Award from the American Astronautical Society. In June 2005 the American Astronautical Society held this special three-day Astronautics symposium in his honor.