

Award for a Distinguished Contribution in Mass Spectrometry



George C. Stafford

The Distinguished Contribution Award recognizes a focused, singular achievement in or contribution to fundamental or applied mass spectrometry. The 2001 award is presented to **Dr. George C. Stafford, Jr.** of ThermoFinnigan Corporation, San Jose, California, the discoverer and developer of mass-selective axial instability scans for quadrupole ion trap mass spectrometry.

Discovery of the mass-selective instability mode made it possible to transform simple ion storage devices into extremely versatile quadrupole ion trap mass spectrometers, impacting a broad landscape of applications and contributing greatly to the commercial success of ion trap MS. Earlier quadrupole ion traps were simply transmission or ion storage devices, or employed mass selective stability in mass analysis. Dr. Stafford recognized that an analytical strategy based on ion motion instability would provide a duty cycle one to two orders of magnitude greater than that of a mass filter operated in mass selective stability mode. By ramping the amplitude of the radiofrequency drive potential, the three-dimensional

trapping field within the ion trap is changed so that the trajectories of simultaneously-trapped species become unstable sequentially based on mass-to-charge ratio. Ions leave the trapping field axially, passing through small holes in the end-cap electrodes to impinge on a detector, yielding the mass spectrum. A high background pressure of helium which is used to damp the motion of the trapped ions enhances mass resolution and sensitivity.

Introduced in 1983 by Dr. Stafford, these developments elevated the quadrupole ion trap mass spectrometer to its current prominence and popularity. The ease of interfacing a quadrupole ion trap to liquid chromatography has made it an analyzer of choice for a wide range of applications in biological, pharmaceutical, environmental, and industrial laboratories.

George Stafford was born in Harrisonburg, Virginia. He received a B.S. degree in Chemistry from Virginia Commonwealth University. His Ph.D. was obtained from the University of Virginia with guidance from Professor Donald Hunt.

The Biemann Medal



Peter B. Armentrout

The Biemann Medal recognizes a significant achievement in basic or applied mass spectrometry made by an individual early in his or her career. The 2001 medal is presented to **Professor Peter B. Armentrout**, University of Utah, for his achievements in elucidation of the intrinsic reactivity and thermochemistry of transition metals, metal-ligand complexes, metal clusters, and metallated molecules of biological and environmental relevance through use of mass spectrometry and collision-induced dissociation.

Professor Armentrout's key contribution to mass spectrometry has been the development of threshold collision-induced dissociation as a reliable and productive means for obtaining thermodynamic information. He is a recognized leader in the field of transition metal thermochemistry, including the elucidation of results for specific electronic states. Professor Armentrout advanced the instrumental design of a guided ion beam tandem mass spectrometer, providing a mass spectrometric tool for detailed and precise examination of the kinetic energy dependence of ion-molecule reactions over an extended energy range. His 1997 publication in the *Journal of Chemical Physics* (volume 106, page

4499) has been cited as a true benchmark which lays the foundation for obtaining quantitative thermochemical data from threshold ion beam studies of increasingly larger and more complicated species, including biopolymers. The experimental and theoretical tools that he and his group have developed provide reliable thermodynamic data that serve as standards for other systems and theory. The CID methods devised by the Armentrout group have attracted many researchers worldwide, a number of whom utilize the software package "Crunch" developed by his group to analyze the data. His productivity can be measured by his over 275 publications in many fields of chemistry.

Peter Armentrout was born in Dayton, Ohio. He received a B.S. degree from nearby Case Western Reserve University in Cleveland, where he conducted research with Professor Rob Dunbar, sparking his interest in ion-molecule chemistry. He obtained his Ph.D. from the California Institute of Technology under the tutelage of Professor Jack Beauchamp.