The 2007 award is presented to Professor Jesse Lee (Jack) Beauchamp for his seminal contributions to the development of ion cyclotron resonance as a tool for studies of gas phase ion chemistry. While a graduate student during the period 1964-1967, and even before the first ICR instrument was operational, Professor Beauchamp published a complete analysis of the phenomenon of ion cyclotron resonance. This theoretical analysis provided the inspiration for the first ion cyclotron double resonance experiment, which became an important technique for studying ion-molecule reactions in the gas phase. In a highly-cited 1971 review titled “Ion Cyclotron Resonance Spectroscopy,” Professor Beauchamp describes the technique’s utility for determining rate constants, acidities and basicities in the absence of complications due to solvation, and reaction mechanisms of organic and inorganic ions. These studies have evolved in numerous laboratories around the world and remain a major activity of many research groups. Professor Beauchamp is presently employing ion cyclotron resonance to investigate biochemical problems, including the chemical sequencing of peptides and nucleic acids and determining the properties, reactions and structures of biologically significant molecules.

The 2007 Medal is presented to Roman A. Zubarev for his leadership in developing electron capture dissociation for MS/MS. Dr. Zubarev showed that ECD preferentially breaks the N-C peptide linkage in underivatized peptides. Cleavage induced by ECD is essentially random along the peptide chain enabling more complete sequencing based on “c” and “z” ions. This dissociation method contrasts with collisional and multiphoton dissociations, which lead to breakage of the weakest bonds. Dr. Zubarev also demonstrated that ECD achieves peptide cleavage without loss of common post-translational modifications, making it the method of choice for determining the nature and sites of such modifications. Since the initial publication in 1998, there has been an exponential rate of growth in research in the ECD technique. Dr. Zubarev has extended the range of ECD applications from FT-ICR mass spectrometers to quadruple ion traps. He continues to investigate related techniques in the newly established area of ion-electron chemistry, including “hot ECD” which can distinguish leucine from isoleucine, electron detachment dissociation that cleaves the C-CO bond in negative ion mode, and electronic excitation dissociation that can increase cation charge.