

Aston Medal 2008

Robert Bateman MBE



Bob Bateman was born in 1947 on a dairy farm near Nantwich, Cheshire. In 1965 he received an industrial scholarship with AEI (Associated Electrical Industries) in Trafford Park, Manchester where he spent a year before going to Cambridge University to study Natural Sciences (Maths and Physics) and Electrical Sciences.

On rejoining AEI in 1969, he worked first on the development of a special double collector version of the MS12 for the measurement of UF_6 isotope ratios, and then on the development of the IM20, an ion microprobe accessory for the MS7 spark-source mass spectrometer. On moving to VG Micromass, he worked on the development of their first double focussing magnetic sector instrument, the MM 70-70, and a Knudsen cell accessory for it. He next worked on the design and development of the MM ZAB-2F, a large reverse geometry double focussing mass spectrometer, incorporating MIKES (Mass analysed Ion Kinetic Energy Spectrometry) and CID-MIKES, designed to meet the specifications of John Beynon (Swansea).

The invention of FAB (fast atom bombardment) at UMIST led to Bob developing "extended geometry" mass analysers which could handle the higher mass molecules which could now be ionised. The MM 70-70 was a double focussing magnetic sector instrument with a 70° electric sector followed by a 5 inch radius, 70° magnetic sector. Bob re-orientated the magnet such that its sector angle was halved to 35° , and its radius doubled to 10 inches, and repositioned so that it retained its double focusing property. This provided a quick and simple solution to quadrupling its mass range, and the new instrument was called the MM 70E. The ZAB-E/SE and 70-S/SE were later developed using a similar approach. Bob also designed and developed a new detector system which not only improved the efficiency of detection of high mass ions but also had a much longer life and did not need frequent gain monitoring and adjustment.

In 1985 Bob designed the TS250, a novel double focusing mass spectrometer with an air-cored ironless magnet, which was free of hysteresis, saturation, remanence and eddy currents, all problems in conventional magnets that give rise to non-linear responses. This magnet could also be scanned and switched quickly and accurately. However, its maximum field strength was quite weak and a 1.5 meter radius magnetic sector was required. Although its overall performance was limited, the instrument incorporated several new developments that were to appear in the AutoSpec, the next magnetic sector instrument that Bob was to design, which superseded the 70 series (forward geometry) and the ZAB series (reverse geometry) mass spectrometers. The AutoSpec had a trisector double focussing geometry (EBE arrangement in which the combination of all three sectors has zero energy dispersion), providing the advantages of both forward and reverse geometries in a single instrument.

In 1989 Mike Guilhaus and Jim Dawson at the University of New South Wales, Australia, published a theoretical paper on an orthogonal acceleration time of- flight mass analyser, stimulating Bob to develop the AutoSpec-TOF, a hybrid magnetic sector – TOF. When this was introduced in 1994 it very quickly replaced the tandem magnetic sector instruments and focal plane detectors.

After the formation of Micromass in 1996, Bob became Technical Director, and when Micromass was acquired by the Waters Corporation he was appointed Vice President for MS Research. In this role, he oversaw the introduction of RF ring-stack ion guides and the subsequent introduction of superimposed travelling waves for manipulation and propulsion of ions at intermediate pressures, and at even higher pressures to separate ions according to their mobility. In September 2008 Bob received the Aston Medal from the British Mass Spectrometry Society for "outstanding contributions to knowledge in the biological, chemical, engineering, mathematical, medical or physical sciences relating directly to outstanding exploitation, application or development of mass spectrometry". Whilst delighted to receive this award, he was anxious to acknowledge the support and contribution of numerous colleagues with whom he had worked, in getting these products off the ground.



from Mike Morris' article in Mass Matters November 2009

