J. Am. Soc. Mass Spectrom. (2013) 24:1326–1327
DOI: 10.1007/s13361-013-0675-0

OBITUARY

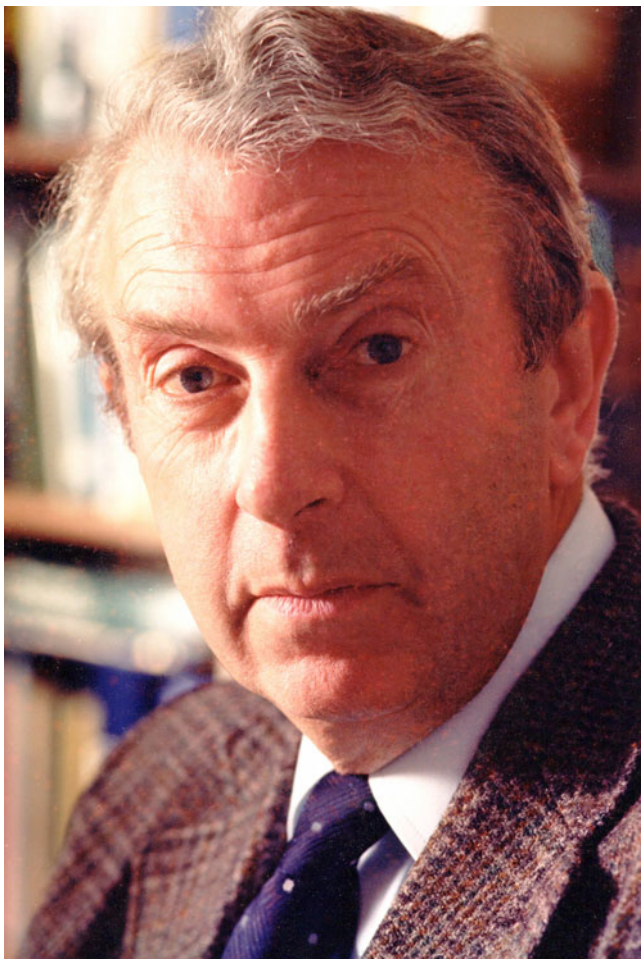
James Douglas Morrison AO (1924–2013)

James (Jim) Morrison, the father of Australian mass spectrometry, died on February 1, 2013, at the age of 88. His numerous innovative contributions to different areas of mass spectrometry, many of which were ahead of their time, such that their significance was not broadly recognized until later, continue to play a role in modern day research.

Jim was born in Glasgow on November 9, 1924 and received his tertiary education at the University of Glasgow from 1942–1948. His Ph.D. was carried out under the supervision of J. Monteath Robertson in the area of X-ray crystallography. It was during this time that he met and married his wife Christine. In 1949, Jim and Christine migrated to Australia in search of a sunnier and warmer climate, where Jim commenced an appointment as a research officer with the Australian Council for Scientific and Industrial Research (later renamed CSIRO). It was here that he became involved with mass spectrometry, having been asked to explore the potential chemical applications of a newly acquired CEC21-102 mass spectrometer. At that time, just a handful of commercial instruments existed worldwide and it was only through direct negotiations between Prime Minister John Curtin and President Harry Truman that a US embargo was lifted, enabling Australia to join this new field of research.

Although chemical analysis was the major focus of Jim's initial studies, he soon recognized that mass spectrometry could be used to examine the fundamental processes of ion formation and energy transfer, providing valuable information about gas-phase ion structures and energetics. This work led to the determination of threshold laws for different ionization processes, confirming the theoretical ideas of Wigner and Wannier and allowing the interpretation of complex processes in terms of differing and competing mechanisms, ionization energies, and dissociation limits.

During this time, Jim became involved with building assorted electron velocity selectors in order to reduce the energy spread of the ionizing electron beam and, hence, to improve the energy resolution that plagued experimental ionization efficiency curve data. Because of the variable success of such devices, in 1959 Jim used his X-ray crystallography training to develop a novel analytical process he called 'deconvolution' that nullified the smearing effect of these energy spreads. This he first carried out manually with Beevers-Lipson strips and an adding machine, and later by using CSIRAC, one of the world's first digital computers. The technique was not believed by many at the time,



but is now widely accepted and used in numerous fields in addition to mass spectrometry.

In 1956, Jim spent a sabbatical period at the University of Chicago with Mark Inghram who, as a graduate student, had worked with Al Nier and Arthur Dempster on the Manhattan Project building large mass spectrometers. It was during this stay that Jim became involved with the construction of the first far UV monochromator-mass spectrometer combination to study the energetics of photon induced ionization-fragmentation processes. This was the genesis of Jim's subsequent passion for machine building.

Following his return to CSIRO, Jim continued with the construction of various mass spectrometers until 1966, when he made the big leap to academia by taking up the position of foundation chair in Physical Chemistry at Melbourne's

Correspondence to: John C. Traeger; *e-mail:* J.Traeger@latrobe.edu.au

newly established La Trobe University. The reason for this major career change is best explained by a quote from Jim's autobiography: "it wasn't that I disliked life at CSIRO, quite the reverse—I was too happy and comfortable there. If you are born and bred in Scotland, Presbyterianism is in your bones. If life is too easy, there is something wrong somewhere."

Jim quickly established a nationally outstanding mechanical workshop at La Trobe University and very soon recommenced building mass spectrometers. Following the advent of minicomputers during the 1960s, and having recognized their great potential for experimental mass spectrometry, he and John Smith constructed one of the first computer-controlled gas chromatograph-mass spectrometer combinations in 1968. This magnetic sector instrument was innovative in that it had a large laminated magnet designed to minimize eddy currents and to help overcome the hysteresis effects that were a problem with fast mass scans.

One of the difficulties with developing new mass spectrometers at that time was the ability to accurately model ion trajectories. To facilitate this, Jim, together with his Ph.D. student Don McGilvery, initiated the development of what has become the industry standard ion optics program called SIMION. The significance of this software was acknowledged in 1998 by ASMS presenting the Distinguished Contribution in Mass Spectrometry award jointly to David Dahl and Don.

Jim's original interest in fundamental ion energetics, together with his enthusiasm for building mass spectrometers, led to the construction of a novel triple quadrupole instrument in 1974. This, combined with a pulsed laser and etalon, was developed for photodissociation studies, providing detailed rovibrational spectra of mass selected ions. In 1977, Rick Yost, a Ph.D. student of Chris Enke, spent a short period at La Trobe University exploring the analytical potential of this triple quadrupole instrument. Subsequently, a joint US patent was granted in 1980 followed in 1993 by an ASMS award to Rick and Chris. Jim later extended his triple quadrupole concept to a novel quinquequadrupole mass spectrometer for the study of ion–molecule reactions.

Jim received numerous awards over the years, recognizing his long-standing contributions to mass spectrometry. He was elected as a Fellow of the Australian Academy of Science in 1964 and as a fellow of the Royal Society of Edinburgh in 1985. These were followed in 1990 by his appointment by Queen Elizabeth II as an Officer of the Order of Australia (AO) for his service to science and to education. The Morrison Medal, awarded at each conference of the Australian and New Zealand Society for Mass Spectrometry (ANZSMS), was established in 1990 to honor Jim's contributions to the development of mass spectrometry in Australia, and in 2009 he was awarded the inaugural ANZSMS Medal for his "outstanding contributions to knowledge relating directly to the exploitation, application, or development of mass spectrometry."

Jim's wife Christine passed away in 2001. He is survived by their three sons and five grandchildren. Jim's passing certainly marks the end of an amazing career, but his many contributions to mass spectrometry will endure for generations to come.

John C. Traeger
Department of Chemistry
La Trobe University Bundoora,
Victoria 3086, AUSTRALIA