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OBITUARY

Dr. Joseph Jack Kirkland (1925–2016)

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Dr. Joseph Jack Kirkland

Jack Kirkland, one of the pioneers who developed HPLC in the mid-1960s, died on October 30, 2016. Dr. Kirkland received A.B. and M.S. degrees in chemistry from Emory University (1950–1951), and a Ph.D. in Analytical Chemistry from the University of Virginia (1953). He worked at DuPont from 1953 to 1992, and in 1989, he co-founded Rockland Technologies, which was acquired by Hewlett-Packard in 1997. Jack then continued with HP (later Agilent) until he retired in 2001. In 2005, he joined Advanced Materials Technology, where he was Vice-President, R&D until his death.Jack is well known for his many innovations in HPLC columns: *Superficially porous particles* in 1969 (Zipax); *bonded phases* (Permaphase, 1972); the direct synthesis of *narrow-size-range 5-micron particles* without particle sizing (Zorbax, 1972); columns of *pure silica* particles (Zorbax-Rx, 1988); *low-pH packings* that were stable at higher temperature (StableBond, 1989); and so-called *shell particles* in 2006 (Halo) for a major improvement in column efficiency and as well as providing an alternative to the use of <2 μm particles columns at >10,000 psi. These columns have resulted in a major contribution to the practice of HPLC and all its many practical applications.

Before his work in HPLC, Jack also made important contributions to gas chromatography. In the mid-1980s, Jack worked for a few years on the emerging technique of field flow fractionation. Eventually recognizing the slow acceptance of this new separation tool at that time, Jack later returned to R&D on HPLC columns. He also contributed (with Joe Glajch and others) to HPLC method development. Their widely cited work on four-solvent optimization (for both reversed-phase and normal-phase chromatography) was an important precursor to the now widely accepted use of computer-based method development. Jack was also part of the team that developed the hydrophobic-subtraction model of reversed-phase column selectivity and the US Pharmacopeia column database.

From 1971 to 1996, Jack and Lloyd Snyder taught more than 5000 people in the principles and practice of HPLC by means of an American Chemical Society short course. Jack co-authored eight books on HPLC (over 60,000 copies sold), and was part of the permanent organizing committee that founded and sponsored the International Symposia on HPLC and related techniques (1973-present). These activities helped create a rapid acceptance of HPLC, as well as its further development.

Jack is the author of 160 peer reviewed publications and 28 patents which together have greatly contributed to our present understanding and practice of HPLC. Over the years, his work has been recognized by a number of awards

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and other honors, including the 1972 American Chemical Society Award in Chromatography, the 1982 Torbern Bergman Medal in Analytical Chemistry from the Swedish Chemical Society, the A. J. P. Martin Chromatography Award Medal in 1997, the first Uwe Neue Award in 2013 for achievements by an industrial scientist, and the 2015 lifetime achievement award from LCGC magazine. Jack was also awarded an honorary D.Sc. degree by Emory University in 1974.

For further information about Jack and his career, see his career autobiography at http://www.casss.org/?BIOINTRO.

Lloyd R. Snyder

I am really sad to hear about the death of Jack Kirkland. He was a great man who spent his whole life aiding and directing the development of high-performance liquid chromatography (HPLC). I last talked with him a year ago at Pittcon, where he was receiving a lifetime achievement award. He was still actively contributing to HPLC column development. I am probably not the ideal person to characterize his contributions to science, since I have always been an outsider to his inner circle. I think I have a reasonable understanding of at least a small part of his gigantic contribution to liquid chromatography (and to an extent to supercritical fluid chromatography, which is my field). Of course, I had heard of him for years before we met. He was already an icon even by 1980.

As a relatively new employee, of the Avondale Division of then Hewlett-Packard (HP), near DuPont in Wilmington, DE, where Jack then worked, I attended a week long HPLC short course in around 1980–1981, taught by Jack, followed by many arm-length interactions over many subsequent years.

I think I received my first copy of "Introduction to Modern Liquid Chromatography" [by Snyder and Kirkland (X Edition)] as part of the short course at HP. I basically wore it out over maybe 20 years. The covers fell off years ago, indicating how useful, and how heavily used, I have found it. About 15 pages are still marked with "Post-It" tags, outlining my most valued insights. Amazingly, almost everything in the book is still accurate and useful. His approach to chromatographic theory remains accurate. His descriptions of hardware requirements, while somewhat dated still provide an accurate outline of what is needed. I have several of his books, but this is my favorite.

I believe that no one has contributed more to the development of packing materials, both totally porous, and what is now called porous shell (modern versions of pellicular or under other names) than Jack Kirkland. In the early days, he also contributed significantly to the development of instrumentation. He continued to contribute to his death.

I totally admire Jacks contribution to HPLC. I believe that no one has contributed more to modern HPLC and UHPLC. He will be remembered for at least generations as one of the major founders of HPLC and UHPLC.

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