

## **In Memoriam: Gary Horlick, 1944–2018**

**By Gary Hieftje and Mike Blades**



It is with great sadness that we announce that Gary Horlick, a giant in the field of analytical spectroscopy, passed away on November 1, 2018. Horlick was world-renowned for his scientific insight and for the clarity and effectiveness of both his scientific publications and conference presentations. He made seminal contributions in several areas of spectroscopy and spectrochemical analysis.

Gary was born in Regina, Saskatchewan, on April 15, 1944, and he attended early school in Calgary, Alberta. He received a BS degree from the University of Alberta in 1965 and a PhD degree in 1970 from the University of Illinois, Urbana-Champaign, working with Howard Malmstadt. He joined the Department of Chemistry at the University of Alberta as an Assistant Professor in 1969. He rapidly rose through the ranks and served as Department Head at Alberta from 1996–2001.

His research interests were in the general area of analytical spectroscopy, with an emphasis on the development of new methods and instruments for elemental and molecular analysis. Gary was among the first to employ the then newly described method of Fourier transform infrared (FT-IR) spectroscopy and as a graduate student fabricated his own Michelson interferometer. This was a heroic task that required him to not only design the instrument from the ground up, but even to grind and polish his own NaCl optics. This early instrument was improved and applied during his early days at Alberta and modified to enable its use in the ultraviolet and visible spectral regions. Later, Horlick pioneered the application of linear image sensors (photodiode arrays) for atomic spectrochemical measurements, work that predated the commercial developments in this area by two decades. In his laboratory, a number of novel elemental analysis systems

were developed based on photodiode arrays and FT-IR spectrometry, and acousto-optic tunable filters that would form the basis of an all-electronic spectrometer system.

His work with Fourier transforms led Horlick naturally into correlation methods, signal processing, and the use of computers in the chemistry laboratory. He was among the first to adopt microprocessors and to incorporate them into his routine laboratory measurements. He and his students even formulated their own laboratory software for spectral storage and file searching.

For much of his later career, Gary addressed unexplained instrumental behavior in ICP spectrometry. At the beginning of those studies, there was considerable confusion among those studying ICP emission spectrometry about the origin and nature of matrix effects. For example, when an easily ionized element (EIE) such as potassium was added to a sample solution, some workers found a signal enhancement whereas others reported a depression. Gary and his group showed that this apparent discrepancy arose from a downward shift and a slight loss in intensity of analyte emission in the presence of the EIE. As a result, workers who viewed emission high in the plasma saw a loss in signal while those who employed a lower viewing position experienced an enhancement. Horlick was also an early adopter of inductively coupled plasma mass spectrometry (ICP-MS) and published a number of key papers that clarified the origin of interelement and matrix effects in that method. One such study explored the influence of ICP central-gas flow rate, and produced what might have been the densest data sets in analytical spectrochemistry. These plots became known as “Horlick mountains” because of their shape.

Gary received the Meggers Award from the Society for Applied Spectroscopy in 1985, and the Fisher Scientific Lecture Award from the Chemical Institute of Canada in 1987. In 1989, he received the Lester W. Strock Award from the Society for Applied Spectroscopy, and he was elected as a fellow of the Royal Society of Canada in 1990. In 1996, he received the Spectrochemical Analysis Award from the American Chemical Society Division of Analytical Chemistry and in 2003 the Pittsburgh Spectroscopy Award from the Spectroscopy Society of Pittsburgh, in recognition of his lifelong contributions to the development and characterization of new methods and systems for

elemental analysis. He received the *Spectrochimica Acta Part B: Atomic Spectroscopy* best paper award in both 1990 and 1992.

Gary mentored many undergraduates, graduate students and postdoctoral fellows during his career. His laboratory was a “must” stop for most scientific visitors to North America and attracted a broad range of collaborators and co-workers.

To spend more time with his family, Gary retired in 2006. He was keenly interested in photography and would enthusiastically show his beautiful collection of local wildlife photos to visitors at his home in Victoria, British Columbia.

Gary was a gentleman and scholar. He delivered his science and his critiques with honesty and most often with characteristic Canadian charm and effusiveness. His friends and colleagues will miss him but most of all he will be missed by his wife, Maureen, and his two daughters, Karen and Laura, and his grand children Kalan and Tessa.



*Gary Horlick (in Mickey Mouse shirt) surrounded by colleagues at the FACSS 2006 symposium held in his honor.*