

## OBITUARY

**Alfred L. Yergey III (September 17, 1941–May 27, 2018)**

Alfred L. Yergey III died on Sunday, 27 May, 2018, of trauma sustained in a tragic accident the day before. He was 76 years old.

Born on September 17, 1941, in eastern Pennsylvania, Al spent his youth in the Willow Grove area. He remained in Pennsylvania for both his undergraduate and graduate education. He attended Muhlenberg College, graduating in 1963 with a BS in Chemistry, then received a PhD in Physical Chemistry from Pennsylvania State University in 1967. The ion-molecule research that became his dissertation, *Energetic Properties of Some Alkylstannanes by Electron Impact* [1], was conducted under the direction of the late Fred Lampe, a noted physical chemist and mentor with whom Al established a life-long friendship. Al continued to pursue the study of ion-molecule reactions as a post-doctoral fellow (1967–1969) with the late Joseph L. Franklin at Rice University and then went on to work with chemical ionization (CI) pioneers Burnaby Munson and the late Frank Field at Esso Research and Engineering Company in Linden, NJ.

Al moved to Scientific Research Instruments (SRI) of Baltimore, MD, in 1971, where he took up the position vacated by Marvin Vestal when Marvin moved to the University of Utah to work on his PhD. At SRI, Al continued to immerse himself in CI studies, working on the Biospect, one of the first commercial CI quadrupole instruments. He also participated in the development of a CI source for magnetic sector instruments, notably the AEI MS 902.

In 1977, Al joined the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) at the National Institutes of Health (NIH). NIH would be the institution at which he would spend the lion's share of his career, first as a Chemist (equivalent to Assistant Professor, tenure track, 1977–1982), a Research Chemist (equivalent to Associate Professor, tenure track, 1982–1986), as Principal Investigator (Tenured, 1986–2012), and finally as NIH Scientist Emeritus with full access to his former laboratory (2012–2018). Awarded the sobriquet “honorary Canadian” by the Lake Louise group, Al also served as Adjunct Professor in the Departments of Biophysics & Molecular Biology and Physiology & Biophysics at the University of Calgary from 2002 to 2011. He was awarded the Adjunct Faculty Research Award by the University of Calgary Faculty of Medicine in 2007 and served as Visiting Scholar for the Alberta Heritage Foundation of Medical Research in 2008. He was a Visiting Scholar at the Instituto Nacional de Salud Publica, Cuernavaca,



(photo courtesy of NIH)

Moreos, Mexico (2009), and at Western Sydney University School of Medicine, NSW, Australia (2013).

Al arrived at NIH with a strong background in physical chemistry, first-hand experience in the development of mass spectrometers, and mentoring by some of the most important pioneers in mass spectrometry. This preparation positioned him well to begin making important contributions to the emerging field of biomedical mass spectrometry. Joining the effort to replace radioactive calcium methodology with isotope dilution in whole body calcium metabolism studies, Al and his team developed tools to extract calcium from blood, urine, and feces (while avoiding contamination from ambient calcium sources) and clinical protocols to enable studies of human volunteers who ranged in age from premature infants through post-menopausal women. Not only did these studies improve our understanding of the bioavailability of nutritional sources of calcium but they also led to modifications in the method of producing infant formulas [2, 3].



Al Yergey with NIH colleagues Stephanie Cologna, Peter Backlund, and Chris Crutchfield (photo courtesy of Susan Weintraub)

With a new focus on the potential applications of mass spectrometry in the biomedical sciences, Al became acutely aware of the limitations of the techniques available in the early 1980s for analyzing hydrophilic molecules in complex matrices. He identified thermospray as the first practical interface between liquid chromatography and mass spectrometry and leveraged his close personal connection to its inventor Marvin Vestal to obtain one of the earliest thermospray sources to fit to an instrument in his lab at NIH. At the 1984 ASMS annual conference he reported the first ever quantification of intact acetylcholine in tissue samples without the need for derivatization or pretreatment [4]. Bolstered by the potential he saw for LC/MS in the analysis of molecules of biological interest, Al never looked back: he remained a strong proponent of thermospray [5] but was quick to embrace emerging strategies for both on-line and off-line LC/MS. The book he co-authored with Charles Edmonds, Ivor Lewis, and Marvin Vestal, *Liquid Chromatography/Mass Spectrometry: Techniques and Applications* [6] became a classic.

As MALDI and electrospray ionization (ESI) made the analysis of larger molecules accessible to the trained mass spectrometrists, Al's focus turned to proteomics. He developed methods for *de novo* sequencing of proteins and created approaches for more robust protein relative quantification [7]. After teaching himself to program, he thrived on utilizing his computational skills to customize interpretation of his experimental data [8]. Both his own directed research and his collaborative efforts led to published works on improving biomolecule analysis and quantification [9–11].

Always interested in bringing new techniques to bear on existing problems, Al enthusiastically embraced the incorporation of ion mobility technology into mass spectrometers, making ion mobility-mass spectrometry the focus of his work in his

final 5 years of research. Once again, Al rapidly recognized the value of a new technique for delivering an added dimension of separation to his studies. He was particularly proud of work from his lab that demonstrated differences in composition (and



Botanical Illustration *Vitis vinifera* – var. *Gamba di Pernice* (Wine Grapes) (reprinted from [www.yergeyillustrations.com](http://www.yergeyillustrations.com) with permission of Patricia Yergey)



therefore potentially differences in therapeutic value) of mixtures of hydroxypropyl-beta-cyclodextrins used in the treatment of Niemann-Pick Disease Type C [12]. His final paper submitted for publication reported the behavior of cyclodextrin negative ions in an ion mobility spectrometer [13].

Al's interest in science ranged far and wide, and his position as head of the NICHD Biomedical Mass Spectrometry Facility afforded him the opportunity to contribute to many aspects of ongoing research at NIH, from educating clinical collaborators on the pros and cons of any given analytical technique to helping with experimental designs to ensure rigorously reliable results. For nearly 25 years Al taught the FAES (Foundation for Education in the Sciences) course at NIH "Introduction to Mass Spectrometry." Though never formally an academic, he nonetheless mentored several generations of post-docs, graduate students and post-baccalaureate trainees who worked in his lab, or for that matter, across the wider NIH campus. Many of these individuals established illustrious careers of their own, thanks in part to Al's willingness to share his knowledge, lend support, and guide their careers. Their names, listed in Table 1 and sprinkled throughout his nearly 200 publications, attest to Al's diverse interests, broad expertise, and collaborative nature (<https://www.ncbi.nlm.nih.gov/pubmed/?term=yergey+A>). Despite this host of widely referenced papers to his credit, his sentimental favorite was an Account and Perspective piece he co-authored for this journal with his son, historian A. Karl Yergey, on the history of the calutron [14].

Al was an active member of ASMS for 50 years, contributing one or more abstracts for the annual conference each year, as well as serving on standing committees and as the Vice-President for Arrangements (1999–2001). In fact, he is one of the few non-vendor members to take on that role. He also served on the Editorial Boards of both *JASMS* and *Analytical Biochemistry*. For nearly 10 years, he co-taught the ASMS short course "Quantitative Mass Spectrometry" at the annual conference. The collected lectures from their ASMS Quantitation course formed the basis for the instructors' collaboration on the book *Principles of Quantitative Mass Spectrometry* [15]. Al's devotion to employing demanding standards and good

statistical practices in quantification is abundantly illustrated in Chapters 4 ("Statistical Methods for Assay Development") and 5 ("Tools for Regression Analysis") of that book. In a sort of reprise of his 50 years involvement with mass spectrometry, Al co-edited Volume 9 of the *Encyclopedia of Mass Spectrometry*, which brings together historical perspectives on the development of mass spectrometry in Part A and biographies of notable people in the field in Part B [16, 17].

Al was as committed to his life outside the lab as he was to that inside. Family was very important to him, and stories of his wife Patty and of his children Karl, Beth, Amy, Wendy, and his six grandchildren peppered his conversation. As former post-doc Kimberly O'Brien observed, "Anyone who knew Al knew how devoted he was to his family. What people may not appreciate is that Al treated members of his lab as a scientific family. He was always busy, yet he gave freely of his time; he was a role model in how to effectively balance your time between work and personal life. I will be forever indebted to Al for his mentorship and for the impact he made on my life." Al's long-time NIH collaborator and dear friend Nancy Vieira noted, "Having worked with Al for more than 30 years, I can speak to his passion of inquisitiveness, be it for the natural/physical sciences (to which his bibliography attests) or for cooking (he prepared many a delicious meal), beer-making and wine tasting. He not only believed but thoroughly engaged in a 'life after work,' which included his church, music-making (of which I was a part), botanical drawing and bike riding." An active member of the NIH Bicycle Commuter Club, Al was a long-standing proponent of bicycle safety. He was a gourmet cook and a wine connoisseur, particularly enjoying in recent times extended visits to Italy with Patty. He was also an amateur brewer, participating in the family beer brewing contest each year and even taking the title on one occasion.

Some 10 years ago, Al took up painting with all the fervor he had brought to his scientific activities. In 2007 he enrolled in the Brookside Gardens School of Botanical Art and Illustration, and in 2015 he was awarded the Botanical Illustrator certificate. A collection of some of his work can be found at [www.yergeyillustrations.com](http://www.yergeyillustrations.com). The image we include here,

**Table 1.** Postdocs and trainees in Al's lab at NIH

Nora Esteban, MD	Staff Pediatrician at Albert Einstein College Medicine
Steven Abrams, MD	Department of Pediatrics, Baylor University Medical School
Anthony Treston, PhD	Lab Chief, Entremed Inc.
Domenico Vicchio, PhD	Section Chief, Analytical Chemistry, Nova Pharmaceutical
Philip Smith, PhD	Professor, School of Pharmacy, University of North Carolina
Kimberly O'Brien, PhD	Professor, School of Hygiene, Cornell University School of Nutrition
Ronald Goans, PhD, MD	Staff Scientist/Physician, REACTS, Oak Ridge, TN
Xin Zhang, PhD	Vice President, Analytical Chemistry, Alza Pharmaceutical
Yaodong Xu, PhD	Section Chief, Analytical Chemistry, Alza Pharmaceutical
Viet Nguyen, PhD	
Yongmin Li, PhD	Analytical Chemist, Mead Johnson
John Gilligan, PhD	Forensics Analysis, NYC Police Dept. Forensics Laboratory
Josef Antal, PhD	
Matthew Olson, MD	Senior Associate Consultant, Mayo Clinic, Jacksonville
Stephanie Cologna, PhD	Assistant Professor of Chemistry, University of Illinois at Chicago
Christopher Crutchfield, PhD	Assistant Professor, Department of Pathology & Laboratory Medicine, University of Cincinnati College of Medicine

“*Vitis vinifera* – var. *Gamba di Pernice*.”, illustrates the affection and precision with which Al approached his drawings, and it seems to us a fitting metaphor for his approach to life. Al regarded each friend and colleague as a rare and precious gift, deserving of special care and attention. As NIH colleague Amina Woods observed, “Al was always there for anybody who needed help with an experiment and was always happy to advise, explain and contribute.” His science, his art, and most of all his friendship, will be greatly missed by all who had the good fortune to have known him.

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