

Fundamental and Applied Research using Liquid Chromatography, Flow Injection Analysis, and Mass Spectrometry

Kevin A. Schug, Associate Professor
Department of Chemistry & Biochemistry
The University of Texas at Arlington

Abstract of Talk: At the outset of my academic career, my lab was focused on development of new methods for the determination and interrogation of noncovalent interactions by electrospray ionization – mass spectrometry. Our contribution to this area has been the incorporation of flow injection analysis and chromatographic methods to enable multiplexing binding determinations. We have been fortunate enough to secure funding from NSF to continue developing this work. It is very fundamental in nature, yet has clear applicability in the drug discovery realm. In recent years, we have developed collaborative relationships with local medical schools to perform method development and trace quantitative analysis. In this more applied regime, we have focused on advancing sample prep and reducing detection limits so that we could track levels of estrogens, metabolites, and various endocrine disruptors in a myriad of biological fluids and tissues. Higher order tandem MS has also been pursued as a means to differentiate isobaric steroid hormones. We are thankful to Eli Lilly and Company for support of some of this work. Most recently, we have been trying our hand at the development of an ambient ionization technique, we have termed continuous flow – extractive desorption electrospray ionization (CF-EDESI). This technique appears to have great promise for analysis of proteins (charge-state manipulation), as well as for analysis of analytes from non-ESI-friendly solvents. Over five years, our lab has worked on a myriad of different and interesting projects. I will present a small compilation of this work, which should appeal to a broad range of interests.

Kevin A. Schug is Associate Professor in the Department of Chemistry and Biochemistry at the University of Texas at Arlington (UTA). Kevin received his B.S. degree in Chemistry in 1998 from the College of William and Mary, and later his Ph.D. degree in Chemistry from Virginia Tech in 2002 under the supervision of Prof. Em. Harold M. McNair. From 2003-2005, he performed post-doctoral research in the laboratory of Prof. Dr. Wolfgang Lindner at the Institute for Analytical Chemistry and Food Chemistry at the University of Vienna in Austria. Since joining UTA in 2005, his research has been focused on the theory and application of separation science and mass spectrometry for solving a variety of analytical and physical chemistry problems. Two main research threads are currently pursued with some intertwined aspects: 1) the use of soft ionization – mass spectrometry for investigating noncovalent interactions, particularly in high throughput formats; and

2) isolation, characterization, and trace analysis of bioactive compounds in complex matrices. Financial support for this research is from UTA, Eli Lilly and Company, that National Institutes of Health, and the National Science Foundation. Dr. Schug has received the 2009 Emerging Leader in Chromatography award given by LCGC magazine, an NSF CAREER award, and most recently, the 2009 Eli Lilly and Company ACACC Young Investigator Award in Analytical Chemistry. He is a member of the Editorial Advisory Board of *Journal of Separation Science*, *LCGC Magazine*, and *Analytica Chimica Acta*.