



# ACS-GHS February Seminar



**When: 21 February, 2018**

**6:15 pm: Networking/ refreshments**

**7:00 pm: Speaker**

**Where: University of St. Thomas,  
3800 Montrose, SHP-146 Active  
Learning Classroom, Houston, TX  
77006**

**Dr. Touradj Solouki  
Baylor University**



Touradj Solouki obtained his B.Sc. in chemistry (1989, Honors) from the University of Texas at Tyler and conducted undergraduate research in physical chemistry at Baylor University. He received his Ph.D. in analytical chemistry (Texas A & M, 1994) where he designed several ion traps and developed high performance instrumentation for ion-molecule and structural analysis of biomolecules. His postdoctoral research at the National High Magnetic Field Laboratory focused on environmental and biological FT-ICR mass spectrometry.

Prior to joining the Chemistry and Biochemistry Department at Baylor University (2011), Dr. Solouki was a faculty member at the University of Maine (1997) where he was promoted to an associate (2003) and full professor (2009) positions. Before moving to Maine, he worked as a senior scientist at the Illinois Institute of Technology and Research Institute in Chicago and served as the Director of the Chemical and Biological Defense/Security Laboratory. Dr. Solouki has also worked in the industry for several years and is ISO 9000 certified (1997). He has served as the chair of Young Mass Spectrometrists (2002-2005) and member of various scientific review panels (NSF/NIH). His current interests are focused on various aspects of tandem mass spectrometry, spectroscopy, and ion mobility aimed at addressing contemporary biomedical research.

## ***Using Molecular Sizes and Shapes For Early Detection of Human Diseases: Orthogonal and Multidimensional Analyses in Omics Studies***

### **ABSTRACT:**

Detection of minor variations between complex sample mixtures is one of the primary challenges in bioanalytical chemistry. Ability to combine advantages of various high-performance instruments, such as mass spectrometry (MS) and vacuum ultraviolet (VUV) spectroscopy, with conventional separation techniques makes multidimensional sample characterization ideal for x-omics studies of complex biological and environmental samples.

Mass spectrometry (MS) offers unparalleled advantages of ultrahigh sensitivity, ultrahigh resolving power, and wide dynamic range to decipher minor variations between complex mixtures and hence is ideal for detection of potential disease biomarkers. Ion mobility (IM) is a gas-phase and, relatively, fast separation technique and combined IM-MS can provide valuable multidimensional data about shapes and sizes of molecules present in “real-world” samples.

In this presentation, advantages of utilizing orthogonal multidimensional techniques and enhanced data analyses for characterization of complex mixtures will be discussed. For instance, methods for deconvoluting IM overlapping isomers, that utilize post-ion mobility collision induced dissociation (CID), will be presented. Moreover, automated identification of potential IM overlapping species for non-targeted characterization of complex mixtures will be discussed and examples from deconvolution of IM overlapping peptides, proteins, oligosaccharides, and petroleum samples will be provided. In addition, examples of using tandem vacuum ultraviolet (VUV) and MS library searchers for unknown identification in metabolomics studies will be presented. Presented results from orthogonal analysis of complex mixtures will demonstrate the powerful capabilities of multidimensional approaches for high-throughput sample characterization in x-omics research.