Heading: "Focus: Emerging Investigators: Editorial"

2017 ASMS 'Emerging Investigators' Focus

Technological advancements in mass spectrometry continue to enable the development of applications that address significant challenges in the physical and life sciences. Conversely, the recognized but unmet needs of the physical and life science communities continue to drive fundamental research in mass spectrometry. This dynamic interplay, and the pivotal role of mass spectrometry in a broad range of research disciplines, is clearly evident in the research articles contained within the 'Emerging Investigators' Focus Section of this issue of *JASMS*. In this focus, we showcase just some of the high quality interdisciplinary research that is being conducted by the latest generation of innovators in the field of mass spectrometry. Similar to our inaugural Emerging Investigators focus published in 2015, the 14 contributing authors to this focus, from the USA, Australia, Germany and Korea, were recommended as individuals who show exceptional promise for doing creative research by a group of prominent mass spectrometrists, including the *JASMS* Editor-in-Chief, Associate Editors, members of the Editorial Board, and members of the ASMS Board of Directors. Although each of these authors have established their independent academic careers in only the past 3-7 years, they are already making important contributions in their respective areas of research, and are influencing the future directions of our field. Brief biographical sketches of the contributing authors are listed below, illustrating the variety of paths by which they entered the field of mass spectrometry, and highlighting their diverse range of fundamental and/or applied research interests. Please join me in celebrating the accomplishments of these emerging investigators. I would like to thank each of the authors for their contributions and look forward to seeing more of their exciting and important work in the future.

W. Alexander Donald joined the School of Chemistry at The University of New South Wales, Sydney, Australia in 2013 after two years as the Centenary Research Fellow at The University of Melbourne (2011-2012) in Professor Richard A. J. O'Hair's laboratory. Alex is a graduate of the University of California, Berkeley (Ph.D. 2010), where he completed his doctoral research in Professor Evan R. Williams' group. He received an IUPAC Prize for Young Chemists, an Australian Research Council Discovery Early Career Researcher Award, the inaugural Michael Guilhaus Research Award (Australian and New Zealand Society for Mass Spectrometry), the Royal Australian Chemical Institute Physical Chemistry Division Lectureship, and the Royal Australian Chemical Institute Peter W. Alexander Medal for Early Career Excellence in Analytical Chemistry. The Donald Group develops and applies instrumentation and methods in mass spectrometry to fundamental problems in chemistry and biochemistry.

Arthur Laganowsky is an Assistant Professor in the Department of Chemistry at Texas A&M University. In 2011, he earned his Ph.D. in Biochemistry from the University of California, Los Angeles, under the mentorship of Professor David Eisenberg. He then carried out post-doctoral research from 2011-2014 as a Nicholas Kurti Junior Research Fellow of Brasenose College at the University of Oxford, under the mentorship of Professor Dame Carol Robinson. In 2014, he started his independent research career as an Assistant Professor at the Institute of Biosciences and Technology, Texas A&M Health Science Center with a joint appointment in the Department of Chemistry, Texas A&M University. Recently, he has extended to a full

appointment in the Department of Chemistry, Texas A&M University. Research in the Laganowsky laboratory focuses on integral membrane protein-lipid interactions, and how these interactions influence membrane protein structure and function. He has pioneered ion mobility mass spectrometry approaches to study membrane protein-lipid interactions and works at the interface between X-ray crystallography and ion mobility mass spectrometry. This combination of skills places his laboratory in an excellent position not only to investigate the molecular implications for disease and biological function of protein assemblies but towards drug discovery.

James S. Prell received his B.A. in Chemistry, Mathematics, and German, with minors in Religious Studies and Music, from Washington University in St. Louis in 2005. He completed his Ph.D. in Chemistry in 2011 at the University of California, Berkeley, advised by Evan R. Williams, where he studied the role of non-covalent interactions in the structures of biomolecular ion complexes and aqueous nanodrops in the gas phase. After a post-doc at UC Berkeley in the group of Stephen R. Leone studying attosecond electron dynamics in solids, he joined the Chemistry and Biochemistry faculty at the University of Oregon (UO) as an Assistant Professor in 2014. At UO, he is a member of the Materials Science Institute and associate member of the Oregon Center for Optical, Molecular, and Quantum Science. He investigates the structure and properties of large biomolecular assemblies, including membrane protein-lipid complexes, using native ion mobility-mass spectrometry and surface-induced dissociation and develops computational and theoretical tools related to these methods. Currently, he advises three graduate and two undergraduate students and is the faculty sponsor for the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science at UO.

Peter Nemes is an Assistant Professor of Chemistry (2013–present) at the George Washington University (GWU). He obtained a Ph.D. in chemistry in 2009 (advisor: Prof. Akos Vertes). He completed postdoctoral training in analytical neuroscience at the University of Illinois—Urbana-Champaign (mentor: Prof. Jonathan V. Sweedler). After serving as a Laboratory Leader and Staff Fellow at the US Food and Drug Administration between 2011–2013, Dr. Nemes joined the faculty of the GWU Department of Chemistry. Research in the Nemes Laboratory develops ultrasensitive and microanalytical platforms for high-resolution mass spectrometry to study how metabolic and proteomic processes orchestrate normal cell heterogeneity during early development of the vertebrate embryo and the central nervous system. Prof. Nemes has authored 33 peer-reviewed publications, 6 book chapters, and 100+ presentations. He is co-inventor of the patented and licensed LAESI mass spectrometry technology. In 2015, Prof. Nemes was named a Beckman Young Investigator by the Arnold and Mabel Beckman Foundation and received the Arthur F. Findeis Award for Achievements by a Young Analytical Chemist by the Division of Analytical Chemistry of the American Chemical Society.

Silvia Balbo is an Assistant Professor in the Division of Environmental Health Sciences at the School of Public Health and at the Masonic Cancer Center of the University of Minnesota. After getting a Ph.D. degree in Medicinal Chemistry from the University of Torino, Italy, she joined the International Agency for Research on Cancer (IARC) in Lyon, France, as a post-doctoral fellow. In 2008 she moved to the Masonic Cancer Center as a research assistant and joined the faculty a few years later. Dr Balbo's work focuses on studying mechanisms of chemical carcinogenesis deriving from environmental and life-style related exposures. She is developing high resolution mass spectrometry-based methods for exposure assessment and for the identification and quantitation of DNA addition products (DNA adducts). Dr Balbo is developing innovative analytical methods to investigate the interactions of the exposome with DNA in various animal and human specimens. The overall goal of her work is to develop biomarkers for the detection of specific DNA adducts, which may give information about the mutagenic significance of the

exposure and provide tools for a better understanding of mechanisms of carcinogenesis, for measuring biological effective doses, and for quantifying effects of exposures in risk assessment.

Christian Bleiholder is an Assistant Professor of Chemistry at Florida State University with a M.Sc. and D.Sc. in Chemistry (University of Heidelberg, 2004 & German Cancer Research Center, 2007). Using theoretical methods, he investigated non-covalent self-assembly reactions with Rolf Gleiter and peptide fragmentation used in mass spectrometry-based proteomics methods with Sándor Suhai. During his post-doctoral research with Michael T. Bowers (University of California, Santa Barbara) he investigated amyloid fibrils, protein deposits implicated in, for example, Alzheimer's Disease with ion mobility / mass spectrometry. His awards include an Alexander-von-Humboldt fellowship (2008-2010) and a Postdoctoral Research Award from the American Chemical Society (2011).

Hugh I. Kim received his B.S. degree in chemistry from University of California, Berkeley in 2003. He then worked in the Science Division at Jet Propulsion Laboratory (JPL), California Institute of Technology (Caltech) as a member of the technical staff before joining the Department of Chemistry at Caltech as a graduate student in physical chemistry under the guidance of Prof. J. L. Beauchamp in 2004. He received his Ph.D. in 2008, and then spent one and half years in the Science Division at JPL as a post-doctoral scholar. He then moved to Pohang University of Science and Technology (POSTECH) in Korea as an Assistant Professor in 2010, and became Associate Professor in 2014. He moved to his current position in the Department of Chemistry, Korea University in 2015. Current research in the Kim group is focused on 1) protein mis-folding, interactions, and related degenerative diseases, 2) host-guest chemistry of synthetic receptor, 3) kinetically controlling protein folding and intermolecular interaction dynamics, and 4) developing instrumental analysis techniques including mass spectrometry and ion mobility spectrometry. Hugh is currently the acting director of the Korean Society for Mass Spectrometry, general program director of Biophysical Society of Korea, and is an editorial board member for the *International Journal of Mass Spectrometry*. He was named one of 30 Young Scientists in Korea in 2016.

Kevin Pagel is currently Associate Professor for Bioorganic Chemistry at the Institute of Chemistry and Biochemistry of the Freie Universität Berlin and guest researcher at the Fritz Haber Institute of the Max Planck Society. He earned a diploma in organic chemistry from the University of Leipzig in 2003 and a Ph.D. from the Freie Universität Berlin in 2007. From 2008-2010 he pursued postdoctoral research with Prof. Dame Carol V. Robinson at the University of Cambridge and later at the University of Oxford. In early 2011 Kevin returned to Germany and started building his independent career, first as a research associate at the Fritz-Haber-Institute (2011-2013) and then as an Assistant (2014-2016) and Associate Professor (2017-) at the Freie Universität Berlin. Research in the Pagel group is focused on the structural analysis of biological macromolecules in the gas phase using ion mobility-mass spectrometry and gas-phase IR spectroscopy techniques. He was honored with several awards including the Mattauch Herzog Award of the German Society for Mass Spectrometry (2016) and the Ron Hites Award of the American Society for Mass Spectrometry (2016).

Abraham Badu-Tawiah obtained his B.Sc. and M.Sc. (2005) degrees from Kwame Nkrumah University of Science and Technology, Ghana, and an M.S. (2007) degree in Chemistry from Indiana University of Pennsylvania. He received a Ph.D. (2012) in Chemistry from Purdue University under the supervision of Professor Graham Cooks. From 2012 to 2014, he was a postdoctoral fellow at Harvard University under the direction of Professor George Whitesides. He joined The Ohio State University, Department of Chemistry and Biochemistry in July 2014 as

an Assistant Professor. His current research is focused on the development of new mass spectrometry techniques for disease detection, and the studies of novel ion chemistry in confined environment.

Si Wu is an Assistant Professor in the Department of Chemistry and Biochemistry at the University of Oklahoma. She received a Bachelor of Science degree in Chemistry in 1997 from Anhui University, China. In 2006, she received her Ph.D. degree in analytical chemistry from Washington State University. Between 2006 and 2008, she conducted her postdoctoral research on top-down proteomics at the Pacific Northwest National Laboratory (PNNL). Later, she worked as a research scientist at Battelle Toxicology Northwest (2008-2010) and as a senior scientist at PNNL (2010-2014). In 2015, she joined the faculty of the Department of Chemistry and Biochemistry at the University of Oklahoma. Her research is focused on developing advanced top-down proteomics techniques to understand protein dynamics and function in different biological systems.

Brian H. Clowers is an Assistant Professor in the Department of Chemistry at Washington State University (WSU). After earning his B.Sc. in Chemistry at the University of Nevada, Reno he conducted his graduate research on the separation of gas phase isomers and ion mobility/mass spectrometry instrumentation under the direction of Prof. Herbert H. Hill at WSU. Following a post-doctoral fellowship with Dr. Carlito Lebrilla at U.C. Davis exploring glycomics approaches using high resolution mass spectrometry, Dr. Clowers joined Pacific Northwest National Laboratory in 2006. There he returned to instrument development under the direction of Dr. Richard D. Smith, honing the ion funnel trap and developing new modes of ion multiplexing for low pressure drift tube experiments. In 2008, Dr. Clowers transitioned to the National Security Directorate at PNNL where he joined an interdisciplinary team focusing on challenges related to chemical and microbial forensics. Dr. Clowers returned to WSU in 2013 as faculty in the chemistry department where his growing research group is exploring intersections between low and high pressure ion mobility measurements and new instrumental configurations that maximize the chemical information derived from tandem mass spectrometry experiments.

Gerardo Gamez obtained his B.Sc. (*summa cum laude*) and M.S. in Chemistry at the University of Texas at El Paso where he performed research with Prof. Gardea-Torresdey in environmental chemistry. He obtained his Ph.D. in Analytical Chemistry at Indiana University-Bloomington with Prof. Gary Hieftje where he performed research in plasma-based atomic spectrometry. During this time he obtained fellowships from the American Chemical Society-Division of Analytical Chemistry and Merck. He performed postdoctoral work at ETH Zurich with Prof. Renato Zenobi and later became a Scientist at EMPA Thun. In 2013 he joined the faculty at Texas Tech University's Department of Chemistry and Biochemistry. His research group focuses on instrumentation and method development of high-throughput chemical imaging techniques via glow discharge optical emission spectrometry elemental mapping, ambient desorption/ionization mass spectrometry sources, as well as performing fundamental studies to better understand laboratory plasma systems. He has served as the president for the Indiana Section of the Society for Applied Spectroscopy, coordinator for the GLADNET European Commission FP6-program research training network, co-organizer of the 1st International Glow Discharge Spectroscopy Symposium 2010, and atomic spectroscopy section chair of the SciX conference. He has co-authored >55 publications, and received the inaugural Richard Payling award and inaugural Royal Society of Chemistry-*Journal of Analytical Atomic Spectrometry* Emerging Investigator Lectureship award.

Ben Bythell received a M.Chem. degree from the University of Bath, UK, in 2002 and a Ph.D. from Oregon State University in 2007. He then held Postdoctoral fellowships at the German Cancer Research Center in Heidelberg (2008-2010) and at the National High Magnetic Field Laboratory (2010-2013). He joined the University of Missouri-St. Louis as an Assistant Professor in 2013. He works at the interface between analytical, computational and biophysical chemistry where he strives to understand the structure, reactivity and gas-phase behavior of biologically- and industrially-important chemicals.

Saiful M. Chowdhury is an Assistant Professor of Bioanalytical Chemistry in the Department of Chemistry and Biochemistry at the University of Texas at Arlington. He received first class B.Sc. (honors) and M.Sc. degrees in Applied Chemistry and Chemical Technology from the University of Dhaka, Bangladesh. He completed another M.S. in bio-organic chemistry from the Florida International University in 2001. In 2006, he earned his Ph.D. in Analytical Chemistry from the Washington State University, Pullman WA, under the supervision of Dr. James E. Bruce. He then pursued postdoctoral research from 2006-2009, in the proteomics and mass spectrometry group of Dr. Richard D. Smith at Pacific Northwest National Laboratory, Richland, WA. From Dec. 2009 - July 2012, he was employed as a research fellow in the laboratory of respiratory biology at National Institute of Environmental Health Sciences (NIEHS), and conducted research under the mentorship of Dr. Michael B. Fessler, head of the host-defense group. He was also co-mentored by Dr. Kenneth B. Tomer, head of the mass spectrometry group. Research in the Saiful lab is primarily focused on the development of novel chemical proteomics strategies utilizing mass spectrometry and their biological application to elucidate the signaling pathways of pattern recognition receptors.

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