

Security and Forensic Applications of Mass Spectrometry

Organized by

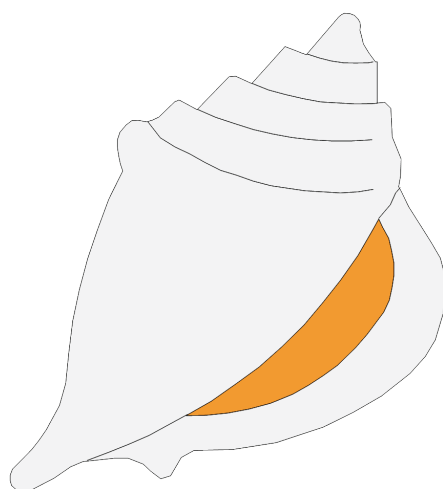
Glen Jackson

West Virginia University

&

Jose Almirall

Florida International University



27th ASMS Sanibel Conference on Mass Spectrometry
January 22 - 25, 2015
Clearwater Beach, FL

Erin Baker
PNNL

Sanibel Conference Committee
Patrick Griffin
Scripps Research

Fanyu Meng
Merck

JC Poutsma
College of William & Mary

Table of Contents

| | |
|---------------------------------|----|
| Program Schedule | 1 |
| Poster List | 7 |
| Directory of Participants | 12 |
| Blank pages for notes | 18 |



Glen Jackson
West Virginia University



Jose Almirall
Florida International University

Speakers – please arrive ½ hour before your session to load your presentation.

THURSDAY, JANUARY 22

4:00 - 7:00 pm Setup all posters, *Salon F*

6:00 – 7:00 pm **Registration**, *Outside Salon D&E*

7:00 – 8:00 pm
Opening Plenary



A Journey to the New World: The Changing Nature of Crime and Criminality
Sir Peter Fahy, *Chief Constable of the Greater Manchester Police, UK*
Session Chairs, Glen Jackson & Jose Almirall
Salon D&E

8:00 – 10:00 pm
Reception
setup all posters
Salon F

Thank you to our sponsors!!!



FRIDAY, JANUARY 23

7:00 - 8:30 am
Continental Breakfast
Salon F

8:30 – 10:00 am
Nuclear and Elemental Attribution and Provenancing I
Session Chair: Jose Almirall
Salon D&E



- 8:30 – 8:55 am Morning Plenary: Attribution for Weapons of Mass Destruction: Evolution of Traditional Forensic Analysis
Vahid Majidi, *Deputy Asst. Secretary of Defense for Nuclear Matters*
- 8:55 – 9:00 am Questions
- 9:00 – 9:25 am Responsiveness in Nuclear Security Analyses through Hyphenated Multi-Collector ICPMS Methods
Doug Duckworth, *Pacific Northwest National Laboratory*
- 9:25 – 9:30 am Questions
- 9:30 – 9:55 am Multi-Signature Geochemical Forensics in a Spatial Bayesian Framework
Gabe Bowen, *University of Utah*
- 9:55 – 10:00 am Questions
- 10:00 – 10:30 am **Coffee Break**, *Salon F*

10:30 – 11:30 am
Nuclear and Elemental Attribution and Provenancing II
Session Chair: Kenyon Evans-Nguyen

- 10:30 – 10:55 am Multi-Isotope Databases to Support Food Authentication, Biosecurity and Forensic Applications
Russell Frew, *University of Otago, NZ & IAEA*
- 10:55 – 11:00 am Questions
- 11:00 – 11:25 am Linking Insects to Humans and Hair to Human Phenotypes Using Stable Isotopes
Glen Jackson, *West Virginia University*
- 11:25 – 11:30 am Questions
- 11:30am – 1:00 pm **Group Lunch**, *Sandpiper Blue Heron Deck*

FRIDAY, JANUARY 23

1:00 – 3:00 pm

Controlled Substances

Session Chair: Adam Hall

Salon D&E

| | |
|----------------|---|
| 1:00 – 1:25 pm | Using Isotopic Fractionation to Link Precursor to Product in the Synthesis of Mephedrone: A New Tool for Combating New Psychoactive Substances Oliver Sutcliffe , <i>Manchester Metropolitan University, UK</i> |
| 1:25 – 1:30 pm | Questions |
| 1:30 – 1:55 pm | Elemental and Organic Forensic Mass Spectrometry Using Fieldable Technologies Kenyon Evans-Nguyen , <i>University of Tampa</i> |
| 1:55 – 2:00 pm | Questions |
| 2:00 – 2:25 pm | Detection of Falsified Medicines with Ambient MS and IMS Facundo Fernandez , <i>Georgia Institute of Technology</i> |
| 2:25 – 2:30 pm | Questions |
| 2:30 – 2:55 pm | Trace Analysis of Illicit Chemistries Using Direct Analyte Probe Nanoextraction (DAPNe) Guido Verbeck , <i>University of North Texas</i> |
| 2:55 – 3:00 pm | Questions |
| 3:00 – 7:00 pm | Free Time |

7:00 pm – 8:00 pm

Promoted Talks I

Session Chair: Guido Verbeck

Salon D&E

| | |
|----------------|---|
| 7:00 – 7:15 pm | Forensic Identification Using Individual Molecular Signature Amina Bouslimani , <i>University of California, San Diego</i> |
| 7:15 – 7:20 pm | Questions |
| 7:20 – 7:35 pm | Profiling of Illicit Drugs in Municipal Wastewater Using a Targeted High Resolution Orbitrap Tandem MS Approach Nicolas Gilbert , <i>University of Québec à Trois-Rivières</i> |
| 7:35 - 7:40 pm | Questions |
| 7:40 - 7:55 pm | Coupling Microchip Capillary Electrophoresis and High Pressure Mass Spectrometry for Portable Applications William M. Gilliland, Jr. , <i>University of North Carolina at Chapel Hill</i> |
| 7:55 - 8:00 pm | Questions |

8:00 – 10:00 pm

Poster Session I

odd-numbered posters present

Salon F

SATURDAY, JANUARY 24

7:00 - 8:30 am
Continental Breakfast
Salon F

8:30 – 10:00 am
Controlled Substances and Explosives
Session Chair: Glen Jackson
Salon D&E

- 8:30 – 8:55 am Fast Detection of Explosives and Illicit Drugs Using a Miniature Ion Trap Mass Spectrometer with Ambient Ionization,
Zheng Ouyang, *Purdue University*
- 8:55 – 9:00 am Questions
- 9:00 – 9:25 am The Potential and Challenges of Paperspray MS for Forensic Chemistry
Arian van Asten, *University of Amsterdam, NL*
- 9:25 – 9:30 am Questions
- 9:30 – 9:55 am Mass Spectral Filters for Classification of Synthetic Designer Drugs
Ruth Smith, *Michigan State University*
- 9:55 – 10:00 am Questions
- 10:00 – 10:30 am **Coffee Break**, *Salon F*

10:30 – 11:30 am
Fire Debris and Explosives I
Session Chair: Ruth Smith
Salon D&E

- 10:30 – 10:55 am Detection of Improvised Explosives as Ion Pairs Using Crown Ether Complexes
Bruce McCord, *Florida International University*
- 10:55 – 11:00 am Questions
- 11:00 – 11:25 am Forensic Value of Light Isotope Ratio Analysis of Explosives
Libby Stern, *Federal Bureau of Investigation*
- 11:25 – 11:30 am Questions
- 11:30am – 1:00 pm **Lunch**, *on your own*

SATURDAY, JANUARY 24

1:00 - 2:00 pm

Fire Debris and Explosives II

Session Chair: Bruce McCord

Salon D&E

- | | |
|----------------|--|
| 1:00 – 1:25 pm | Quantitative Mapping of Explosive Residues on Post-Blast Debris from Pipe Bombs Using a Total Vaporization Technique Coupled with Mass Spectrometry John Goodpaster , <i>Indiana University Purdue University Indianapolis</i> |
| 1:25 – 1:30 pm | Questions |
| 1:30 – 1:55 pm | Combining Mass-Spectrometry and Chemometrics for Improved Fire Debris Analysis Michael Sigman , <i>University of Central Florida</i> |
| 1:55 – 2:00 pm | Questions |
| 2:00 - 2:30 pm | Break |

2:30 - 3:30 pm

Inks and Documents

Session Chair: Chip Cody

- | | |
|----------------|--|
| 2:30 – 2:55 pm | Chemical Characterization of Printing Inks for Forensic Document Examination Jose Almirall , <i>Florida International University</i> |
| 2:55 – 3:00 pm | Questions |
| 3:00 – 3:25 pm | Mass Spectrometry Applications to the Forensic Analysis of Documents Jorge Zacca , <i>Brazilian Federal Police, BR</i> |
| 3:25 – 3:30 pm | Questions |
| 3:30 – 7:00 pm | Afternoon Free |

7:00 – 8:00 pm

Promoted Talks II

Session Chair: Gabe Bowen

- | | |
|----------------|---|
| 7:00 – 7:15 pm | Laserless Matrix-Assisted Ionization (MAI)-Mass Spectrometry: A Novel Method for Potential Use in Airports and Field Hospitals Christian Reynolds , <i>Wayne State University</i> |
| 7:15 – 7:20 pm | Questions |
| 7:20 – 7:35 pm | Detection of Chemical Tracers in Human Breath by Mass Spectrometry for Development of a New Forensic Technique Jenny Van , <i>San Diego State University</i> |
| 7:35 - 7:40 pm | Questions |
| 7:40 - 7:55 pm | Analytical Investigation of Fingerprint Residues and Aging Studies by GC-MS, LC-HRMS and MALDI-Imaging Stefanie Pleik , <i>Justus Liebig University</i> |
| 7:55 - 8:00 pm | Questions |

8:00 – 10:00 pm

Poster Session II

even-numbered posters present

Salon F

SUNDAY, JANUARY 25

7:00 - 8:30 am
Continental Breakfast
Salon F

8:30 – 10:00 am
Inks/Dyes, Microbial and Biological I
Session Chair: Arian Van Asten
Salon D&E

- 8:30 – 8:55 am Meeting Forensic Analytical Challenges with Liquid Chromatography and Mass Spectrometry
Stephen Morgan, *University South Carolina*
- 8:55 – 9:00 am Questions
- 9:00 – 9:25 am Characterization of Potential Ricin Containing Samples with Mass Spectrometric Tools
Karen Wahl, *Pacific Northwest National Laboratory*
- 9:25 – 9:30 am Questions
- 9:30 – 9:55 am Typing of Single Nucleotide Polymorphisms with MALDI-TOF in Forensic Genetics
Niels Morling, *University Copenhagen, DK*
- 9:55 – 10:00 am Questions
- 10:00 – 10:30 am Coffee Break, *Salon F*

10:30 am - 12:00 pm
Inks/Dyes, Microbial and Biological II
Session Chair: Glen Jackson and Jose Almirall
Salon D&E

- 10:30 – 10:55 am Adding Another Dimension to Cadaver-Detection Dogs in Australia
Shari Forbes, *University Technology, AU*
- 10:55 – 11:00 am Questions
- 11:00 – 11:25 am Imaging Molecules in Forensics
Bryn Flinders, *FOM Institute, AMOLF, NL*
- 11:25 am – 11:30 am Questions
- 11:30 - 11:55 am New Approaches in Fire Debris Analysis: Rapid Dynamic Headspace Concentration followed by DART-MS and Chemometric Analysis
Adam Hall, *Northeastern University*
- 11:55 - 12:00 pm Questions
- 12:00 pm Closing Remarks

Poster List

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All posters should be set up by 7:00 pm on Thursday

Remove all posters by 10:30 am on Sunday

odd-numbered posters will be presented on Friday from 8:00 - 10:00 pm

even-numbered posters will be presented on Saturday from 8:00 - 10:00 pm

- 1 Characterization of Lignin and Products of its Thermal and Biological Degradation using a Size Exclusion or Gel Permeation Chromatography in Combination with High Resolution Mass Spectrometry and Evaporative Light Scattering Detection; Anastasia Artemyeva¹, Alena Kubátová¹, Evguenii Kozliak¹, *University of North Dakota*
- 2 Spice Wars – Are you Battle Ready? Analysis of Synthetic Cannabinoids via Gas Chromatography – High Resolution Time of Flight Mass Spectrometry; David E. Alonso¹, John Rorabek² and Joe Binkley; *LECO Corporation, St. Joseph, MI. 2) Berrien County Forensic Laboratory, Berrien Springs, MI*
- 3 Using Metabolomics-Based Multiplex LCMS Assay to Facilitate Investigation of Predictive Biomarkers for Colorectal Cancer; I. Asante, S. Liu, H. Pei, E. Yoo, E. Zhou, F. Schumacher, D. Conti, S. Louie; *University of Southern California*
- 4 Enhanced Imaging of Developed Fingerprints using Mass Spectrometry Imaging; M J Bailey¹, M De Puit², S Bleay³, M Levin⁴; ¹*Department of Chemistry, University of Surrey, Guildford, GU2 7XH*; ²*Netherlands Forensic Institute, The Hague, Netherlands*; ³*Centre for Applied Science and Technology, Home Office, St Albans, UK*; ⁴*Department for Identification and Forensic Science, Israel Police, Jerusalem, Israel*
- 5 Novel Screening Technique for Opioids in Toxicological Specimens via SPME DART™ TOF MS; Rachel Beck, F-ABFT and Dr. David Graves; *University of Alabama at Birmingham and Alabama Department of Forensic Sciences*
- 6 Direct Analysis in Real-Time / Orbitrap Mass Spectrometry as a Tool for the Direct, Global Characterization and Differentiation of Explosive Samples for Forensic Application; Maxime C. Bridoux¹, Adrian Schwarzenberg², Jean-Claude Tabet², Richard B. Cole²; ¹*CEA, DAM, DIF, F-91297 Arpajon, France*; ²*UPMC, IPCM/CSOB, UMR 8232, 4 Place Jussieu, 75252 cedex 05, Paris, France*
- 7 Forensic Identification using Individual Molecular Signature; Amina Bouslimani¹, Alexey Melnik¹, Mingxun Wang², Theodore Alexandrov^{3,4,5}, Pieter C. Dorrestein^{1,6}; ¹*Skaggs School of Pharmacy and Pharmaceutical Sciences, University of California, San Diego, La Jolla, CA*; ²*Department of Computer Science and Engineering, University of California, San Diego, La Jolla, CA*; ³*Center for Industrial Mathematics, University of Bremen, 28359, Bremen, Germany*; ⁴*Steinbeis Innovation Center SCiLS Research, 28211, Bremen, Germany*; ⁵*SCiLS GmbH, 28359 Bremen, Germany*; ⁶*Departments of Chemistry, Biochemistry and Pharmacology, University of California, San Diego, La Jolla, CA*
- 8 Monolithic Materials for Rapid Sample Preparation; Esme Candish^{1,3}, Hans-Jürgen Wirth³, Andrew Gooley^{1,3}, Robert A Shellie¹, Emily F Hilder¹; ¹*Australian Centre for Research on Separation Science (ACROSS), School of Chemistry, Hobart, Tasmania, Australia*; ³*Trajan Scientific & Medical, Ringwood, Victoria, Australia*
- 9 Stabilities of Mephedrone in Biological and Non-biological Matrices; Heather Ciallella, Stephanie Oddi, Karen S Scott; *Arcadia University*
- 10 Dart and Forensics: 10 Years Later; Robert B. Cody; *JEOL USA, Inc.*
- 11 Two Workflows for Bulk Substance Analysis using DART and Automated Library Searches; Maria C. Prieto Conaway and Marta Kozak; *Thermo Fisher Scientific, San Jose, CA*

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- 12 Rapid Detection of Cocaine, Benzoylcegonine and Methylecgonine in Fingerprints using Desorption Electrospray Ionisation Mass Spectrometry (DESI) and Secondary Ion Mass Spectrometry (SIMS); Catia Costa^{*a}, Tara Salter^b, Daniel Driscoll^a, Marcel de Puit^d, Roger Webb^c, Kim Wolff^c Melanie Bailey^a; ^a*University of Surrey, Department of Chemistry, Surrey, GU2 7XH, UK*, ^b*National Physical Laboratory, Teddington, Middlesex, TW11 0LW, UK*, ^c*University of Surrey Ion Beam Centre, Surrey, GU2 7XH, UK*, ^d*Netherlands Forensic Institute, The Hague, Netherlands*, ^e*Institute of Pharmaceutical Science, Kings College, London SE1 9NH*
- 13 Elemental Mixture Analysis with Differential Mobility Separation; Spiros Manolakos, Francy Sinatra, Leila Albers, Kevin Hufford, James Alberti, Erkinjon Nazarov, and Theresa Evans-Nguyen; *Draper Laboratory; Tampa, FL*
- 14 Non-Targeted MS Strategy for Designer Steroid Detection; Travis M. Falconer, Sarah E. Voelker, Lisa M. Lorenz, Mary B. Jones, and Jonathan J. Litzau; *U.S. Food & Drug Administration, Forensic Chemistry Center*
- 15 Autonomous Underwater Mass Spec And Sampler System- Core Technology for High Content Environmental Forensics Mapping; David Fries, Geran Barton; *University of South Florida, Tampa, FL*
- 16 GC-MS Chemical Fingerprint Comparison of Evaporated and Unevaporated Fuel Samples using the Internal Standard, Di-N-Decyl Sulfide; Sarah Glenn, Ashley Veach, Cecily Reily, Murrell Godfrey, *Department of Chemistry and Biochemistry, University of Mississippi, University, MS*
- 17 Profiling of Illicit Drugs in Municipal Wastewater using a Targeted High Resolution Orbitrap Tandem MS Approach; Nicolas Gilbert¹; Sung Vo Duy²; Thomas Chapuis²; Paul Fayad²; Sébastien Sauvé²; André Lajeunesse^{1*}; ¹*Université du Québec à Trois-Rivières, QC, Canada*, ²*Université de Montréal, QC, Canada*
- 18 Qualitative Analysis of New Psychoactive Substances by Ion Mobility Spectrometry, Direct Analysis in Real Time Quadrupole Time-of-Flight, and Gas Chromatography Quadrupole Time-of-Flight; Seongshin Gwak and Jose R. Almirall; *Department of Chemistry and Biochemistry and International Forensic Research Institute; Florida International University, Miami, Florida*
- 19 Coupling Microchip Capillary Electrophoresis and High Pressure Mass Spectrometry for Portable Applications; William M. Gilliland, Jr.^{*}, Erin Redman, J. Scott Mellors, J. Michael Ramsey; *University of North Carolina at Chapel Hill*
- 20 Elemental Profiling of Electrical Tapes by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS); Claudia Martinez¹, Tatiana Trejos¹ and Jose R. Almirall¹, ¹*International Forensic Research Institute and Department of Chemistry and Biochemistry, Florida International University, University Park, Miami, Florida 33199*
- 21 Atmospheric Pressure Photoionization with and without Laser Ablation on a Portable Ion Trap; Igor V. Veryovkin, Yeni P. Yung, Yang Cui and Luke Hanley^{*}; *Department of Chemistry, University of Illinois at Chicago*
- 22 Application of Solvent Assisted Ionization Inlet Mass Spectrometry (SAII-MS) to Support Screening and Quantification of Counterfeit Drugs; Lyla Hassan, Dr. Charles N McEwen; *University of the Sciences, Philadelphia PA*
- 23 Forensic Determination of *Cannibis* and its Analogues Employing UHPLC, TLC and ASAP Coupled to a Compact Single Quadrupole Mass Spectrometer; Daniel Eikel, Simon Prosser, and Jack Henion; *Advion, Inc., 10 Brown Rd., Ithaca, NY*

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- 24 Development of a Rapid Fire Screening Method for the Detection of Synthetic Cannabinoids; Jennifer C. Hitchcock and Gregory L. McIntire; *Ameritox, Ltd., 486 Gallimore Dairy Road, Greensboro, NC*
- 25 Differentiation of Cannabidiol and Tetrahydrocannabinol Using Tandem MS and H/D Exchange; William D. Hoffmann¹, Glen P. Jackson^{1,2}; ¹*Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26506*; ²*C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506*
- 26 Differentiation of Heparin from other Glycosaminoglycans (GAGs) by Paper Spray Portable Mass Spectrometry; Hongli Li and Samantha Wickramasekara; *US Food and Drug Administration/CDRH/OSEL/DBCMS, Silver Spring, MD*
- 27 Identification of Two Sources of Sr in Hair by Isotopic Analyses on Hair Segments; Lihai Hu, Diego P. Fernandez, Thure E. Cerling; *Department of Geology and Geophysics, University of Utah*
- 28 The Application of Direct Analysis in Real Time and Time-of-Flight Mass Spectrometry to Distinguish Wild from Cultivated Agarwood (*Aquilaria* spp.); Natasha M. Kreitals
- 29 Optimizing Ambient Ionization by DART – Solid Phase Microextraction, Thermal Separation and Statistics; Joseph LaPointe, Brian D. Musselman and Robert Goguen; *IonSense Inc. Saugus, MA*
- 30 Ion Mobility Mass Spectrometry with Different Drift Gases in New Designer Drug Analysis; Karel Lemr¹, Lucie Borovcová¹, Sandra Benická¹, Kevin Schug², Vladimír Havlíček³; ¹*Regional centre of Advanced Technologies and Materials, Dept. Anal. Chem., Faculty of Science, Palacký University, 17.listopadu 12, 771 46 Olomouc, Czech Republic*; ²*Department of Chemistry & Biochemistry, The University of Texas at Arlington, Arlington, USA*; ³*Institute of Microbiology, v.v.i., Videnska 1083, CZ 14220 Prague 4, Czech Republic*
- 31 Development of a Classification System for Plant-Based Forensic Evidence using Direct Analysis in Real Time Mass Spectrometry (DART-MS); Ashton D. Lesiak¹, Robert B. Cody², A. John Dane², Rabi A. Musah^{1*}; ¹*Department of Chemistry, University at Albany, SUNY, 1400 Washington Ave Albany, NY 12222*, ²*JEOL USA, Inc. 11 Dearborn Rd, Peabody, MA 01960*
- 32 Discrimination of Smokeless Powders using Sorbent-Coated Wire Mesh with DART-MS and Offline Statistical Analysis; Frederick Li¹, Joseph Tice³, Brian D. Musselman³, and Adam B. Hall²; *Boston University School of Medicine: Biomedical Forensic Sciences Program. Boston, MA*; *Northeastern University: The Barnett Institute of Chemical and Biological Analysis and the Department of Chemistry and Chemical Biology, Boston, MA*; *IonSense, Inc., Saugus, MA*³
- 33 Screening and Quantitation of Forensically Relevant Drugs from Blood and Urine by Paper Spray MS; Nicholas E. Manicke¹ and Mike Belford²; ¹*Department of Chemistry and Chemical Biology, Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis IN*, ²*Thermo Scientific. San Jose, CA 95134*
- 34 Adduct Formation of Explosives and Separation from Complex Mixtures using Trapped Ion Mobility Spectrometry- Mass Spectrometry; Alan Mckenzie¹, John Daniel DeBord¹, Mark Ridgeway², Melvin Park², Gary Eiceman³ and Francisco Fernandez-Lima¹; ¹*Department of Chemistry and Biochemistry, Florida International University, Miami, FL*; ²*Bruker Daltonics, Inc., Billerica, Massachusetts 01821*, ³*Department of Chemistry, New Mexico State University, Las Cruces, NM*
- 35 Analysis of Cathinone Derivatives and their Optical Isomers using Low Flow CE-MS; Mehdi Moini¹, Christopher Rollman¹; ¹*Department of Forensic Sciences, The George Washington University, Washington, DC*

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- 36 Development of an Ambient Ionization Mass Spectrometric Method to Characterize Organic Components and Discriminate between Types of Gunshot Residue (GSR); Rabi A. Musah^{1*}, Ashton D. Lesiak¹, Robert B. Cody², A. John Dane²; ¹*Department of Chemistry, University at Albany, SUNY, 1400 Washington Ave Albany, NY 12222*; ²*JEOL USA, Inc. 11 Dearborn Rd, Peabody, MA 01960*
- 37 A Field Deployable Ion Trap Mass Spectrometer for Multi Target Monitoring; Berk Oktem, Alexander Misharin, Konstantin Novoselov and Vladimir Doroshenko; *MassTech Inc, 6992 Columbia Gateway Drive, Columbia, MD 21046*
- 38 Surface Acoustic Wave Nebulization (SAWN) for Home Made Explosives Synthesis Product Characterization; Oyler, BL¹; Chipuk, J²; Lareau, R³; Yoon, SH¹; Wilson M¹; Goodlett, DR¹; Kilgour DPA¹; *University of Maryland Baltimore, 20 N Pine Street, Baltimore, MD, Signature Science, 2550 Huntington Ave, Alexandria, VA, Dep. of Homeland Security, S&T Directorate, Atlantic City, NJ*
- 39 Environmental Forensics Determination of Emerging Contaminants in Wastewater Samples; Sarah Prebihal^{*} and Frank Dorman, *The Pennsylvania State University, University Park, PA 16802*; Jack Cochran, *Restek, 110 Benner Circle, Bellefonte, PA 16823*.
- 40 Analytical Investigation of Fingerprint Residues and Aging Studies by GC-MS, LC-HRMS and MALDI-Imaging; S. Pleik^{1,2}, B. Spengler², S. Luhn¹, D. Urbach¹, D. Kirsch¹; ¹*Bundeskriminalamt Wiesbaden, 65173 Wiesbaden*, ²*Institute of Inorganic and Analytical Chemistry, Justus Liebig University Giessen, 35392 Giessen, Germany*
- 41 Comparative Analysis of Explosives Using GC-MS, CE-MS, nanoLC-MS, and MEKC-UV; Christopher Rollman¹, Mehdi Moini¹, Christine Copper², Ashton Genzman², Jacqueline Rine², Karen Brensinger¹, Ira Lurie¹; ¹*Department of Forensic Sciences, The George Washington University, Washington, DC*; ²*Department of Chemistry, United States Naval Academy, Annapolis, MD*
- 42 *Laserless* Matrix-Assisted Ionization (MAI)-Mass Spectrometry: A Novel Method for Potential Use in Airports and Field Hospitals ; Christian A. Reynolds^{1,2} Kevin Jooß¹ Shubhashis Chakrabarty¹ Daniel W. Woodall¹ Casey D. Foley¹ Zachary J. Devereaux¹ Ellen D. Inutan¹ Srinivas B. Narayan³ Thomas H. Sanderson^{2,4} Sarah Trimpin^{1,2}; ¹*Department of Chemistry, Wayne State University, Detroit, MI*, ²*Cardiovascular Research Institute, Detroit Medical Center: Detroit Hospital (DMC), Detroit, MI*, ³*Detroit Medical Center, Detroit, MI*, ⁴*Department of Emergency Medicine*
- 43 Quantitative Analysis of Poly(dimethylsiloxane) by LC/APCI-MS (MRM) for the Analysis of Lubricant Evidence in Sexual Assault Cases ; Katherine A. Schilling[†], Derek Dorrien[‡], Anna Deakin[‡]; [†]*Division of Chemistry and Chemical Engineering, California Institute of Technology, Pasadena, CA*; [‡]*Defense Forensic Science Center, Forest Park, GA*
- 44 Direct Detection of Cocaine in Addicted Rat Brain Tissue by MALDI ; Leila Shahri, Alexis C. Thomson, and Troy D. Wood
- 45 Characterization of Methamphetamine and its By-products by DART-MS; Donna M. Iula¹, Rabi A. Musah², Marek A. Domin³, Robert B. Cody⁵, A. John Dane⁵, Brian D. Musselman⁴, and Jason R.E. Shepard²; ¹*Cayman Chemical Co, Ann Arbor, MI*, ²*Department of Chemistry, University at Albany, State University of New York (SUNY), 1400 Washington Ave., Albany, NY*, ³*Mass Spectrometry Center, Merkert Chemistry Center, Boston College, 2609 Beacon Street, Chestnut Hill, MA*, ⁴*IonSense, Inc., Saugus, MA*, ⁵*JEOL, USA, Inc., Peabody, MA*
- 46 Unexpected Results: Unique Findings in Finished Dosage Form Tablets; Nohora V. Shockey, Renee N. Easter and Brian L. Boyd; *U.S. Food and Drug Administration, Forensic Chemistry Center, Cincinnati, OH*

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- 47 Direct Analysis in Real Time Mass Spectrometry (DART-MS) of Cathinone “Bath Salt” Drugs and Mixtures; Rabi A. Musah¹, Robert B. Cody³, Marek A. Domin², A. John Dane³, and Jason R.E. Shepard¹; ¹*Department of Chemistry, University at Albany, State University of New York (SUNY), 1400 Washington Ave., Albany, NY*, ²*Mass Spectrometry Center, Merkert Chemistry Center, Boston College, 2609 Beacon Street, Chestnut Hill, MA*, ³*JEOL USA, Inc., 11 Dearborn Rd, Peabody, MA*
- 48 Development and Validation of Method for LC/MS/MS Analysis of Stimulant Drugs and Application of the Method to Analyze these Drugs in Waste Water Samples before, during, and after Football Games in a College Town; Waseem Gul^{1,2}, Brandon Stamper^{1,3}, Candice Tolbert¹, Murrell Godfrey³, Mahmoud A. ElSohly^{*,1,2,4}; ¹*ElSohly Laboratories, Inc., 5 Industrial Park Drive, Oxford, MS*; ²*National Center for Natural Products Research*, ³*Department of Chemistry and Biochemistry*, and ⁴*Department of Pharmaceutics, The University of Mississippi, University, MS*
- 49 A Study on the Effect of Contamination from Handling in the Forensic Characterization of Printing Inks Using Tandem LIBS/LA-ICP-MS; Kiran Subedi and Jose Almirall; *Department of Chemistry and Biochemistry and International Forensic Research Institute (IFRI), Florida International University, Miami FL*
- 50 Detection of Chemical Tracers in Human Breath by Mass Spectrometry for Development of a New Forensic Technique; Jenny K. Van and Dale A. Chatfield, *San Diego State University, San Diego, CA*
- 51 Mass Spectrometric Solutions for Pre- and Post-Event Trace Detection in Security and Forensics; Philip J. Tackett, J. Mitchell Wells, and Dennis J. Barket, Jr., *FLIR Detection, West Lafayette, IN*
- 52 Characterization of Nitrate Dimer Formation Mechanism by Means of Thermal Desorption Atmospheric Pressure Ionization Mass Spectrometry; Andrey Vilkov, Jack Syage; *Morpho Detection LLC, Santa Ana, CA*
- 53 Extraction and Identification of Dyes from Fibers by Automated Microfluidics and Mass Spectrometry: Forensic Application; Nelson R Vinueza,^a Stephen Furst,^b Ken Garrard,^b Tom Dow,^b Sean Gunning,^b Nadia Sultana,^a Yufei Chen,^a Alexis Owens,^a Min Li,^a David Hinks^a, ^a*Department of Textile Engineering, Chemistry and Science, College of Textiles, North Carolina State University*, ^b*Precision Engineering Center, North Carolina State University*
- 54 Blood-Brain Barrier Permeability Assay and Cell Membrane Chromatography – Mass Spectrometry for Investigating and Databasing Drug Analogs; Kristina Williams, Amanda Kretsch, Guido Verbeck; *Dept. of Chemistry, Univ. of North Texas, Denton, TX*
- 55 Characterization and Discrimination of Printing Inks Using DART-MS and MALDI-MS for uses in Forensic Document Analysis; Rhett Williamson, José Almirall; *Department of Chemistry & Biochemistry, International Forensic Research Institute, Florida International University, Miami, FL*
- 56 Using Mass Spectrometry to Identify Species from Bone, Blood, and Tissue Samples; Teubl, J¹., Yang, H²., Siegel, D²., Fenyö, D.¹, ¹*NYU Langone Medical Center, New York, NY*, ²*Office of the Chief Medical Examiner, New York, NY*