Guido Fridolin Verbeck, IV

University of North Texas
Department of Chemistry
1155 Union Circle, #305070
Denton, TX 76203

972-978-2150
gverbeck@unt.edu

EDUCATION

Ph.D., Chemistry (September 2004) Texas A&M University, College Station, Texas.
Major: Analytical Chemistry, Mass Spectrometry
Thesis: The Development of a Liquid Nitrogen-Cooled Ion Mobility Spectrometry/ Time-of-Flight Mass Spectrometry for the Separation of Electronic Isomers.

M.S., Chemistry (May 1999), University of Alabama at Birmingham, Birmingham, Alabama.
Major: Analytical Chemistry, Separation Science
Thesis: The Analysis of Proteins and Peptides by Capillary Electrophoresis Using Two-Color Laser-Induced Fluorescence Detection.

B.S., Chemistry (December 1996), Northeast Louisiana University, Monroe, Louisiana.

EXPERIENCE

Professor of Chemistry and Biochemistry (2018-Present)
University of North Texas, Denton, TX

- Continue to develop front-end mass spectrometry tools within Biochemistry, Forensic Science, and Analytical Chemical applications.
- Continue to develop micro mass spectrometry, computational algorithms, and machine learning, specifically for field portable instrumentation and exposome mass spectrometry.
- Further develop soft-landing mass spectrometry and ion mobility for nanoparticle characterization, pharmacological effects, and toxicological effects to better understand nanoparticle efficacy.
- Identify new growth areas within mass spectrometry, and exploit our expertise to find future funding.

Associate Dean of Research and Graduate Studies, College of Science (2018-2020)
University of North Texas, Denton, TX

- Oversee the college staff of pre-award, post-award, grant development, cost sharing, and grant/contract compliance.
- Manage college level graduate recruitment, internships, and professional graduate programs.
- Represent the college with corporate research partners and innovation incubator space. Direct the corporate research event and industry engagement.
- Create a faculty Seed Grant program to initiate new research projects along College of Science priorities.
- Represent the College of Science on research and graduate student university committees.

Associate Professor of Chemistry and Biochemistry (2012-2018)
University of North Texas, Denton, TX

- Develop the nanomanipulation platform and utilize in Direct Analyte Probe Nano-extraction within Biochemistry, Forensic Science, and Analytical Chemical applications.
- Continue to develop micro mass spectrometry and applications, specifically for field portable instrumentation.
- Further develop soft-landing mass spectrometry and drift tubes to comb for new materials and aid in understanding a bottom-up approach.
- Identify new growth areas within mass spectrometry, and exploit our expertise to find future funding.

Assistant Professor of Chemistry (2006-2012),
University of North Texas, Denton, TX

- Design and development of vacuum and plasma instrumentation for the creation of a new softlanding mass spectrometry material processing tool.
- Develop new methods for the analysis of intact inorganic and organo-metallic complexes.
- Identify new growth areas and write proposals for novel material combing.

Staff Scientist (2005-2006),
Zyvex, Richardson, TX

- Design and development of a commercially available miniature ion trap mass spectrometer for field portable applications.
- Analytical support for current and new instrument designs for scanning electron microscopes, interferometers, and ion optical devices.
- Identify new growth areas and write proposals for micro assembled devices as analytical instruments.
- Develop new vacuum technologies for miniature instrumentation.

Postdoctoral Fellowship (2003-2005),
Oak Ridge Associated Universities, Oak Ridge, TN

- Design and development of submillimeter cylindrical ion trap mass spectrometer for field portable applications.
- Design and development of PCBs and interfaces for microinstrumentation.
- Modify current commercial ion trap mass spectrometers for mobile laboratories.
- Develop a drift tube inlet for external ionization interface to a micro ion trap.

Graduate Research Associate (1997-2003),
Department of Chemistry, Texas A&M University,
Department of Chemistry, University of Alabama at Birmingham.

- Design and development of a nitrogen-cooled ion mobility mass spectrometer.
- Design and development of single, two, and four color laser induced fluorescence capillary electrophoresis instruments.
- Software development for data acquisition of capillary electrophoresis and mass spectrometry instruments.
- Maintenance and upkeep of group analytical instrumentation

Teaching Assistant (1997-2001),
Department of Chemistry, Texas A&M University,
Department of Chemistry, University of Alabama at Birmingham.

- Authored multiple laboratory procedures on data acquisition and instrumentation.

- Instructed undergraduate laboratories in Instrumental Analysis, Analytical Methods, Inorganic Chemistry, Physical Chemistry, and General Chemistry.

Quality Control Chemist (1995-1996),
ANGUS Chemical Company, Inc., Sterlington, Louisiana.

- Developed new methods for Gas Chromatography, HPLC, and FTIR.
- Trained plant personnel in basic math, chemistry and laboratory techniques.
- Performed bench techniques to certify product.

SKILLS AND EXPERTISE

- **Instrumentation:** Quadrupole Ion Trap, Cylindrical Ion Trap, Matrix-Assisted Laser Desorption Ionization Time-of-Flight Mass Spectrometry, Electrospray Ionization-Quadrupole Time-of-Flight, Fast Atom Bombardment Sources, Ion Cyclotron Resonance Mass Spectrometry, Ion Mobility Mass Spectrometry, Capillary Electrophoresis, Gas Chromatography, High Performance Liquid Chromatography, UV-Vis Spectroscopy, Fourier Transform Infrared Spectroscopy.
- **Software:** SolidWorks, AutoCAD, Python, Visual Basic, Visual C++, Qbasic, Fortran, Gaussian 03 09, Unix, Linux, Cerius, Insight, Java, Perl, Apache, PHP, and MySQL.
- **Data Acquisition:** Keithley Metrabyte's DAS , Data Translation's DT 1600, and National Instrument's GPIB and DAQ interface, 32-bit MicroPIC.

HONORS AND ACTIVITIES

- Dallas Innovates, Future 50. The 50 disruptive innovators in the Dallas-Fort Worth area. https://dallasinnovates.com/future50dallasfortworth2021/ (2021)
- Associate Dean for Research and Graduate Studies (2018-2020)
- President's Council Service Award (2018)
- Member International Council on Materials Education (2018-Present)
- Chair of College of Science Faculty Council (2017-2020)
- University of North Texas Innovator Award (2016-2017)
- Member Document Security Alliance, (2015-Present)
- Chair Faculty Senate, UNT (2015-2016),Vice Chair Faculty Senate, UNT (2014-2015), Member (2012-Present)
- Teacher Scholar Award, University of North Texas (2014)
- Excellence in Advising Award, University of North Texas (2014)
- Member of the Society for Applied Spectroscopy (2013-Present)
- Member of the Royal Society of Chemistry (2012-Present)
- Early Career Award for Research Creativity, University of North Texas (2011)
- Professor of the Year, Alpha Chi Sigma, Beta Eta Chapter, University of North Texas (2011)
- President of Board for the Harsh Environment Mass Spectrometry Society (2010-2014)
- Soaring Eagle, University of North Texas, (2009)
- Air Force Office of Scientific Research Young Investigator Award, YIP (2008).
- Organizing Committee for 6^{th},7^{th},8^{th},9^{th}, 10^{th}, 11^{th} Workshop on Harsh Environment Mass Spectrometry (2006-Present).
- Organizing Committee for the 13^{th} International Conference on IMS (2004).
- George W. Kunze Graduate Fellowship, Texas A&M University (2003).
- Paul Harris Fellow, Rotary Club of Shreveport, Rotary Foundation (2003).
- Procter & Gamble Research Fellowship (2002-2003).
- Pinnacle National Honor Society, Texas A&M University (2002).

- Texas A&M University Chapter of the American Chemical Society's Outstanding Graduate leadership Award (2002).
- President of the Graduate Student Advisory Committee (2001-2002).
- Member of Phi Lambda Upsilon Graduate Honor Society, Texas A&M University (2001).
- Active on Local TAMU Sigma Xi Science Promotion Committee, Texas A&M University (2000-2001).
- Dean's Graduate Scholar Award, Texas A&M University (2000).
- Member of Sigma Xi National Research Organization (1999-2007).
- Alabama Section of the American Chemical Society Graduate Student Award, University of Alabama at Birmingham (1998).
- Third Place Award, Sigma Xi Graduate Student Research Competition, University of Alabama at Birmingham (1998, 1999).
- First Place Award, Student Research Competition, 75th Annual Meeting of the Alabama Academy of Science, University of South Alabama (1998).
- Received the American Chemical Society's Certified Degree in Chemistry, Northeast Louisiana University (1996)
- Member of Phi Kappa Phi Honor Society, Northeast Louisiana University (1996).
- American Institute of Chemists Award for Outstanding Graduating Senior, Northeast Louisiana University (1996).
- American Chemical Society Award for Outstanding Analytical Chemistry Student, Northeast Louisiana University (1996).
- President and Member of Mortar Board National Honor Society, Northeast Louisiana University (1995).
- President of NLU Chapter of the American Chemical Society Student Affiliate (1995,1996).
- Frances Baldwin Scholarship, Northeast Louisiana University (1995).
- Robert L. Holt Memorial Scholarship, Northeast Louisiana University (1994).
- (1988).

Editorial Boards

- Journal of the American Society for Mass Spectrometry, Member (2017-2022)
- Journal of Forensic Chemistry, Member (2017-2020)

RESEARCH PRODUCTIVITY

Funded Grants, Contracts, and Gifts:

External Funded ($5,309,708)

- Bill and Melinda Gates Foundation (2022-2023) Verbeck, G.F. UNT/Inspect IR Tuberculosis and Malaria (To develop low-cost breath-based diagnostics for diagnosing tuberculosis and malaria in low- and middle-income countries), $145,064.
- DoD Air Force STTR Phase 2, (2022-2023) Verbeck, G.F.; Gardner, A. STTR Phase 2, F2-14840 Airborne Contaminant Trap (ACT) for Risk Mitigation and Airmen Safety, $748,464 ($255,681).
- DoD Air Force STTR X21.A CSo, (2021) Verbeck, G.F.; Gardner, A.; Respiratory Augmentation of Disease Surveillance (RADS), 21-1-FX 21A-TCSO1-0231, Phase 1, $50,000 ($18,972).
- DoD Air Force STTR X21.A CSo, (2021) Verbeck, G.F.; Gardner, A.; USAF Augmented Maintenance Prediction (AMP), 21-1-FC20C-TCSO1-0222, Phase 1, $50,000 ($18,900).
- Thermo Finnigan LLC, (2021) Verbeck, G.F., Utilizing Teslin Substrate for Paperspray Mass Spectrometry. $50,000.

- InspectIR Project Funding – (2020-2021), Verbeck, G.F., Development of Uses and Methods for Portable and Benchtop Mass Spectrometry Techniques for Health and Wellness. $164,971
- Worlds Contract (2020) Verbeck, G.F., Portable, Non-Invasive, COVID-19 Detection and Analysis. $90,087.
- LaCore Labs Contract (2019-2024) Verbeck, G.F., Establishment of the LaCore/UNT Research Facility and QA Lab for Creation and Determination of New Methods within the Nutraceutical Industry. $483,693.
- LaCore Labs Instrumentation Gift (2019) Verbeck, G.F., Development of a QA Laboratory with Inspire Park, UNT Frisco. $1,000,000.
- University of Texas at Dallas/Defensewerx/Sofwerx Subcontract – (2019), Verbeck, G.F., Development of a Portable Mass Spectrometer for the Detection of CWAs at the Water/Air Interface. $100,848.
- LaCore Contract – (2019), Verbeck, G.F., Development of a Uniform Method for Supplement Analysis Utilizing ESI-Ion Mobility TOF Mass Spectrometry. $54,700
- NexGen Aquaculture Contract – (2018-2020), Verbeck, G.F., Validation and Characterization of the Proteins from Tungara Frog Foam. $180,964 (NAVI $31,119, URC $43,828, Biome $106,017).
- InspectIR Project Funding – (2018-2019), Verbeck, G.F., Development of a Broad Spectrum Drug Breathalyzer for a Portable Mass Spectrometer Platform. $138,450 ($5,049 Seed, $133,401 Development.
- Inficon, Instrument Grant – (2013-2019), Verbeck, G.F., Development of a Portable Quadrupole Mass Analyzer for the Analysis on In-Situ Field Measurements, $450,000.
- National Institute of Justice (NIJ-2013-3361), (2014-2016) (PI) Verbeck, G.F.; Golden, T., Microscopy with Direct Analyte Probe Nanoextraction (DAPNe)-Coupled to Nanospray Mass Spectrometry for Localized Chemical Analysis of Document Inks, $380,986.
- Cancer Prevention & Research Institute of Texas – R-13-HIHR-1 – High Impact/High Risk Research Award (2012-2015), Verbeck G.F., Single organelle analysis for metabolite in tumor cells using microfluidic devices coupled to direct Nanoextraction-Nanospray, $181,419
- Semiconductor Research Corporation (SRC) – Center for Electronic Materials Processing and Integration (CEMPI) – (06/01/2012-05/31/2013), Verbeck, G.F., *In Situ Characterization of ULK ILD and its Film Stacks under Active RIE Processing using MIR-IR Spectroscopy and Mass Spectrometry*, $33,300.
- FY11 Battlefield Forensic Proposal (DOD) – (08/15/2011-02/14/2013), Verbeck, G.F., *Extraction of Chemical Residue with Fingerprint Transfer and Lifts*, $186,033.
- Semiconductor Research Corporation (SRC) – Center for Electronic Materials Processing and Integration (CEMPI) – (06/01/2010-05/31/2011), Verbeck, G.F., *Supersonic Expansion-Coupled to Softlanding Mass Spectrometry for the Combing, Deposition, and Interrogation of New Dielectric Materials*, $35,000.
- Defense University Research Instrumentation Program – (05/01/2009-04/30/2011) Verbeck G.F.; Scharf T., *Acquisition of an Inductively-Coupled Plasma Mass Spectrometer with Laser Ablation Source for Surface Characterization*, $244,516.
- MRCEDM Grant – (01/15/09-06/01/10) Billo, R.; Dennis, B., Verbeck, G. *A MEMS Microreactor Device for Synthetic Fuel Refining,* $66,711 (GV $33,897).
- GN1804 – 1st Detect Research Grant (02/01/2008-05/31/2014) Verbeck, G.F., *Development of a Deployable Mini Mass Spectrometer and Peripheral Technology*, $592,413.
- DOD AFOSR-BAA-2007-07 (2008) Young Investigator Award, Verbeck, G.F. *Development of Novel Preparative Mass Spectrometry Instrumentation for the Advancement of New Materials and Nanofabrication*, $300,000.

- GN1281 – SpaceHab Research Grant (10/01/2006-09/31/2007) Verbeck, G.F., *Design and Development of Miniature Ion Trap Mass Spectrometer for Environmental Analysis in Space Vehicles*, $70,000.
- GN1371 – Zyvex Instrument Grant (01/01/2007-12/31/2008) Verbeck, G.F., *Nanomanipulation-coupled mass spectrometry for biomaterials and intra and extracellular characterization,* $67,000.

Internal Funded ($46,000)

- 63483, Research Support Grant,(12/15/2012-12/14/2013) Verbeck, G.F.; DeCaen, A., Juried *Art Selection and Show for The Art of Metabolism*, $5000.
- GA9152 Faculty Research Grant (09/01/2011-08/31/2012) Verbeck, G.F., *Softlanding Mass Spectrometry of Mo_xP_y Clusters to Comb for Novel Catalysts for the Hydrodesulfurization (HDS) and Hydrodenitrogenation (HDN) Reactions,* $7500
- GXXXX Learning Enhancement Grant (06/01/2011-08/31/2011) Golden, T.; Verbeck, G.F.; Cooke, S.A. *Development of a Forensic Chemistry Professional Science Masters Program*, $18,890 (G.V. $6000).
- GA9250 Faculty Research Grant (09/01/2009-08/31/2010) Verbeck, G.F. *MEMS Ion Optics and Mass Analyzers*, $7500.
- G33519 Faculty Research Grant(09/01/2008-08/31/2009) Verbeck, G.F. *Implementation of Softlanding Mass Spectrometry for Fabrication of Smectic and Cluster Surfaces*., $5,000.
- G33598 Faculty Research Grant(09/01/2007-08/31/2008) Verbeck, G.F. *Development of Softlanding Mass Spectrometry for Fabrication of Nanostructures,* $5,000.
- G34267 - Faculty Research Grant(01/01/2007-08/31/2007) Verbeck, G.F. *Development of Softlanding Mass Spectrometry for Fabrication of Nanostructures*, $5000.
- Junior Faculty Summer Research Fellowship(06/01/2007-08/31/2007) Verbeck, G.F. *Development of an Ion Mobility coupled Time-of-Flight Mass Spectrometer for High-Throughput analysis of Biothreat Agents*, $5,000.

Publications:

Thomas, B.; Anderson, K.; W. De Silva, I.; Verbeck, G.; Taylor, S., "ATR-FTIR Spectroscopy is Sensitive to Thermal Decay of Bone Collagen", *App. Spect.,*77 (2023) 53.

Smart, K.: Reyes, K.; Wilder, K., Acree, W.; Verbeck, G.; Golden, T., "Ionic liquids as stationary phases for the gas chromatographic separation of fentanyl analogues", *For. Chem*. 31 (2022) 100452.

Nayek, S.; Lund, A.K., Verbeck, G.F., "Inhalation exposure to silver nanoparticles induces hepatic inflammation and oxidative stress, associated with altered renin-angiotensin system signaling, in Wistar rats", *Envirom. Tox,* 37 (2022) 457-467.

Virgen, C. A.; Fox, J.D.; Santariello, P.; Winfield, J.L.; Wright, K.C.; Verbeck, G.F., "Portable membrane inlet mass spectrometric detection and analysis of chemical warfare agent simulants at the U.S. Army Dugway Proving Ground S/K Challenge event" , *Int. J. Mass Spectrom.* **Invited**, 468 (2021) 116635.

Subedi, D.R.; Jang, Y.; Ganesan, A.; Schoellhorn, S.; Reid, R.l Verbeck, G.F.; D'Souza, F., "Donor–acceptor conjugates derived from cobalt porphyrin and fullerene via metal-ligand axial coordination: Formation and excited state charge separation", *J. Porphyrins Phthalocyanines*, 25 (2021) 533-546.

De Silva, I.W.; Couch, A.; Verbeck, G.F., "Paper spray mass spectrometry utilized with synthetic microporous polyolefin silica matrix substrate in rapid detection and identification of more than 190 synthetic fentanyl analogs", *J. Am. Soc. Mass Spectrom*, 32 (2021) 420-428.

Benitz, A.; Thomas, M.B.; De Silva, I.W.; Nesterov, V.N.; Verbeck, G.F.; D'Souza, F. "Photoinduced Electron Transfer in Axially Coordinated Supramolecular Zinc Tetrapyrrole Bis(styryl)BODIPY Donor-Acceptor Conjugates", *ChemPhotoChem*, 5 (2021) 260-269.

Nayek, S.; DeSilva, I.W.; Aguilar, R.; Lund, A.; Verbeck, G.F. "Toxicological alterations induced by sub-acute exposure of silver nanoparticles in Wistar rats", *J. App. Tox.* 41 (2021) 972-986.

Gurung, S.; Dubansky, B.; Virgen, C.A.; Verbeck, G.F.; Murphy, D.W. "Effect s of crude oil vapors on the cardiovascular flow of embryonic Gulf killifish", *Sci. Total Env.* 751 (2021) 141627.

Nayek, S.; Aguilar, R.; Juel, L.A.; Verbeck, G.F. "Metallic Nanoparticle Production and Exposure/Deposition System for Toxicological Research Applications using Zebrafish", *Rev. Sci. Inst.*, 91 (2020) 94101:1-94101:10. DOI: 10.1063/5.0013428

Sturtevant, D.; Lu, S.; Zhou, Z.; Shen, Y.; Wang, S.; Song, J.; Zhong, J.; Burks D.; Yang, Z.; Yang, Q.; Cannon, A.E.; Herrfurth, C.; Feussner, I.; Borisjuk, L.; Munz, E.; Verbeck, G.F.; Wang, X.; Azad, R.K.; Singleton, B.; Dyer, J.M.; Chem, L.; Chapman, K.D., Guo, L. "The genome of jojoba (Simmondsia chinensis): A taxonomically isolated species that directs wax ester accumulation in its seeds", *Sci. Adv*., 6 (2020) 1-13.

De Silva, I.W.; Nayak, S.; Singh, V.; Reddy, J.; Granger, J.K.; Verbeck, G.F. "Paper Spray Mass spectrometry utilizing Teslin® substrate for rapid detection of lipid metabolite changes during COVID-19 infection", *Analyst*, 145 (2020) 5725-5732.

Kiselak, T.D.; Koerber, R.; Verbeck, G.F., "Synthetic Route Sourcing of Illicit at Home Cannabidiol (CBD) Isomerization to Psychoactive Cannabinoids Using Ion mobility-coupled-LC-MS/MS", *Forensic Sci. Int.,* 308 (2020) 110173-110180.

Cao, D.J.; Aldy, K.; Hsu, S.; Getrick, M; Verbeck, G.F.; DeSilva, I, Feng, S. "Review of Health Consequences of Electronic Cigarettes and the Outbreak of Electronic Cigarette, or Vaping, Product Use-Associated Lung Injury", *J. Med. Tox.*, 16 (2020) 295-310.

Aldy, K.; Cao, D.J.; Hsu, S.; McGetrick, M.; Willcuts, D.; Verbeck, G.F.; DeSilva, I, "Severe E-cigarette, or Vaping, Product Use Associated Lung Injury (EVALI) Requiring Veno-venous Extracorporeal Membrane Oxygenation", *Pediatric Critical Care Medicine*, 21 (2020) 385-388.

Lewis, H; Webb, R; Verbeck, G.F.; Bunch, J.; de Jesus, J.; Costa, C.; Palitsin, V.; Swales, J.; Goodwin, R.; Sears, P.; Bailey, M., "Nanoextraction coupled to liquid chromatography mass spectrometry delivers improved spatially resolved analysis", *Anal. Chem*., 91 (2019) 15411-15417.

De Silva, I.W.; Kretsch, A.R.; Lewis, H-M; Bailey, M.; Verbeck, G.F., "True One Cell Chemical Analysis: A Review", *Analyst*, 144 (2019) 4733-4749.

De Silva, I.W.; Converse, D.T.; Juel, L.A.; Verbeck, G.F., "A Comparative Study of a Microporous Polyolefin Silica-Based Paper and Cellulose Paper Substrates Utilizing Paper Spray-Mass Spectrometry in Drug Analysis", *Anal. Meth.*, 11 (2019) 3066-3072.

Femi-Oyetoro, J.D.; Yao, K.; Tang, R.; Ecton, P.A.; Roccapriore, K.; Mhlanga, A.; Verbeck, G.F.; Weathers, D.L.; Perez, J.M., "Mechanism for etching of exfoliated graphene on substrates by low-energy electron irradiation from helium plasma electron sources", *J. Vac. Sci. Technol. A*, 37 (2019) 021401-1 to 021401-7.

Fallatah, W.; De Silva, I.W.; Verbeck, G.F.; Jagadeeswaran, "Generation of transgenic zebrafish with 2 populations of RFP- and GFP-labeled thrombocytes: analysis of their lipids", *Blood Adv.*, 3 (2019) 1406-1415.

Femi-Oyetoro, J.D.; Yao, K.; Roccapriore, K.; Ecton, P.A.; Tang, R.; Jones, J.D.; Verbeck, G.F.; Perez, J.M., "Effects of high-dosage focused electron-beam irradiation at energies ≤ 30 keV on graphene on SiO2", *App. Surf. Sci.,* 469 (2019) 325-330.

De Jesus, J.; Bunch, J.; Verbeck, G.F.; Webb, R.; Costa, C.; Goodwin, R.; Bailey, M., "Application of Various Normalisation Methods for Microscale Analysis of Tissues Using Direct Analyte Probed Nano-extraction (DAPNe)", *Anal. Chem*., 90 (2018) 12094-12100.

McBride, E.M.; Verbeck, G.F., "Investigation by Direct Inject ESI-MS and GC-MS of an Alleged Leuckart Route-Specific Impurity of Methamphetamine", *For. Sci Int..*, 288 (2018) 278-282.

McBride, E.M.; Verbeck, G.F., "A Mass Spectrometer in Every Fume Hood", *J. Am. Soc. Mass Spectrom.*, 29 (2018) 1555-1566.

McBride, E.M.; Verbeck, G.F., "Direct-Infusion Electrospray Ionization-Mass Spectrometry Profiling of Fentanyl and Acetylfen-tanyl Reaction Mixtures will be published in International Journal of Mass Spectrometry", *Int. J. Mass Spectrom.*, 428 (2018) 55-61.

Dubansky B.l Verbeck, G.F.; Mach, P.; Burggren W., "Methodology for exposing avian embryos to quantified levels of airborne aromatic compounds associated with crude oil spills" , *Env. Tox. Pharm.* 58 (2018) 163-169.

McBride, E.M.; Keller, R.E., Verbeck, G.F., "Investigation of a Novel Route to N-Phenethyl-4-piperidone, An Intermediate of Fentanyl, by Direct-Inject Electrospray Ionization-Mass Spectrometry", *J Clandestine Lab. Investigating Chemists Assoc*. 28 (2018) 12-19.

Mach, P.M.; Winfield, J.L.; Aquilar, R.A.; Wright, K.C.; **Verbeck, G.F.,** "A Portable Mass Spectrometer Study Targeting Anthropogenic Contaminants in Sub-Antarctic Puerto Williams, Chile" *Int. J. Mass Spectrom.* 422 (2017) 148-153.

Hamilton, J.S.; Aguilar, R.; Petros, R.A.; Verbeck, G.F., "DAPNe with micro-capillary separatory chemistry-coupled to MALDI-MS for the analysis of polar and non-polar lipid metabolism in one cell", *J. Am. Soc. Mass Spectrom* 28 (2017) 918-928.

Huynh, V.; Phelps, M.S.; Golden, T.D.; Verbeck, G.F., "Direct analyte-probed nanoextraction (DAPNe) coupled to matrix-assisted laser desorption ionization (MALDI) for examination of the ink chemistry on documents", *For. Chem.* 2 (2016) 86-92.

Giannoukos, S.; Brkic, B.; Taylor, S.; Marshall, A.; Verbeck, G.F., "Chemical sniffing instrumentation for security applications", *Chem. Rev.* 116 (2016) 8146-8172.

McBride, E.; Kretsch, A.; Garibay, L.K.; Brigance, K.; Buss, B.; Verbeck, G.F., "Rapid Experimental and Theoretical Analysis of Synthetic Phenethylamine Drug Analogues", *For. Chem*. 1 (2016) 58-65.

Hildebrand, Z.; Mach, P.; McBride, E.; Dorreyatim, M.N.; Tayloe, J.; Carlton, D.; Meik, J.; Fontenot, B.; Wright, K.C.; Schug, K.A.; **Verbeck, G.F**, "Point source attribution of ambient contamination events near unconventional oil and gas development ", *Sci. Total Environ.* 573 (2016) 382-388.

Huynh, V.; Sasiene, Z.J.; Mach, P.M.; Golden, T.D.; Verbeck, G.F., "Laser Ablation-Coupled with DAPNe-NSI-MS Applied to Redacted Documents", *Sci. & Just*. 56 (2016) 329-340.

Ecton, P.A.; Beatty, J.; Verbeck, G.F.; Lakshantha, W.; Rout, B.; Perez, J.M., "Low-energy Electron Irradiation of Preheated and Gas-exposed Single-Wall Carbon Nanotubes", *App. Surf. Sci.* 387 (2016) 822.

Hildebrand, Z.; Carlton, D.; Fontenot, B.; Meik, J.; Walton, J.; Thacker, J.; Korlie, S.; Shelor, C.P.; Kadjo, A.; Clark, A.; Usenko, S.; Hamilton, J.S.; Mach, P.; Verbeck, G.F.; Hudak, P.; Schug, K.A., "Temporal Variation in Groundwater Quality in the Permian Basin of Texas, a Region of Increasing Unconventional Oil and Gas Development", *Sci. Total Environ.* 562 (2016) 906-913.

Nnaji, C.N.; Mach, P.M.; Acheampong, J.S.; Falconer, T.M.; Verbeck, G.F., "Analysis of Trace Amounts of Adulterants Found in Powders/Supplements Utilizing Raman Spectroscopy coupled to Direct Analyte-Probed Nanoextraction-Nanospray Ionization-Mass Spectrometry", *Anal. Meth.* 8 (2016) 4798.

Hamilton, J.S.; Verbeck, G.F., "One-Cell Analysis as a Technique for True Single-Cell Analysis of Organelles in Breast Tumor and Adjacent Normal Tissue to Profile Fatty Acid Composition of Triglyceride Species", *J. Anal. Onocology* , 5 (2016) 47-54.

Hamilton, J.S.; Gorishek, E.L.; Mach, P.M.; Sturtevant, D.; Ladage, M.L.; Suzuki, N.; Padilla, P.A.; Mittler, R.' Chapman, K.D.; Verbeck, G.F., "Evaluation of a custom single Peltier-cooled ablation cell for elemental imaging of biological samples in laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS)", *J. Anal. At. Spectrom*., 31 (2016) 1030-1033.

Suzuki N, Bassil E, Hamilton JS,Inupakutika MA, Zandalinas SI, Tripathy D; Luo, Y.; Dion, E.; Fukui, G.; Kumazaki, A.; Nakano, R.; Rivero, R.M.; Verbeck, G.F.; Azad, R.K.; Blumwald, E.; Mittler, R. "ABA Is Required for Plant Acclimation to a Combination of Salt and Heat Stress." *PLoS ONE* 11 (1): e0147625. doi:10.1371/journal.pone.0147625 (2016).

Phelps, M.; Sturtevant, D.; Chapman, K.D.; Verbeck, G.F., "Nanomanipulation-Coupled Matrix-Assisted Laser Desorption/ Ionization-Direct Organelle Mass Spectrometry: A Technique for the Detailed Analysis of Single Organelles", *J. Am. Soc. Mass Spectrom.,* 27 (2016) 187-193.

Mach, P.M.; McBride, E.M.; Sasiene, Z.J.; Brigance, K.R.; Kennard, S.K.; Wright, K.C.; Verbeck, G.F., "Vehicle-Mounted Portable Mass Spectrometry System for the Covert Detection via Spatial Analysis of Clandestine Methamphetamine Laboratories", *Anal. Chem.*, 87 (2015) 11501-11508.

Huynh, V; Williams, K.C.; Golden, T.D.; Verbeck, G.F., "Investigation of Falsified Documents via Direct Analyte Probe Nanoextraction coupled to Nanospray Mass Spectrometry, Fluorescence Microscopy, and Raman Spectroscopy", *Analyst.*, 140 (2015) 6553-6562.

Richardson, M.C.; D'Souza, N.A; Xia, C.; Shi, S.; Mach, P.; Verbeck, G.F., "Metal Ion and Benzene Remediation of Simulated Hydraulic Fracturing "Fracking" Waste Water Using Natural Materials", *Hydraulic Fract. J.,* 2 (2015) 82-86.

Phelps, M.; Verbeck, G.F., "A lipidomics demonstration of the importance of single cell analysis", *Anal. Meth.*, 7 (2015) 3668-3670.

Nnaji, C.; Williams, K.C; Bishop J.M.; Verbeck, G.F., "Using Hydrogen as GC/MS carrier and buffer gas to analyze energetic materials and illicit drugs.", *Sci. & Just.* 55 (2015) 162-167.

Verbeck, G.F.; Bierbaum V.M., "Focus on Harsh Environment and Field-Portable Mass Spectrometry: Editorial", *J. Am. Soc. Mass Spectrom*, **Guest Editor,** 26 (2015) 199-200.

Mach, P.M.; Wright, K.C.; Verbeck, G.F.; "Development of Multi-Membrane Near-Infrared Diode Mass Spectrometer for Field Analysis of Aromatic Hydrocarbons", *J. Am. Soc. Mass Spectrom*, 26 (2015) 281-285.

Mansfield C.M.; Alloy, M.M.; Hamilton, J.; Verbeck, G.F.; Newton, K.; Klaine, S.J.; Roberts, A.P., "Photo-induced toxicity of titanium dioxide nanoparticles to *Daphnia magna* under natural sunlight", *Chemosphere*, 120 (2015) 206-210.

Phelps, M.; Hamilton, J.; Verbeck, G.F., "Nanomanipulation-coupled nanospray mass spectrometry as an approach for single cell analysis", *Rev. Sci. Inst.*, 85 (2014) 124101.

Walton, B.L.; Hoffmann, W.D.; Verbeck, G.F.; **Reprint of** "Sub-eV Ion Deposition Utilizing Soft-Landing Ion Mobility for Controlled Ion, Ion Cluster, and Charged Nanoparticle Deposition", *Int. J. Mass Spectrom.*, Accepted (August 2014). **Invited Special Issue "MS 1960 to Now"**.

Clemons, K; Kretch, A.; Verbeck, G.F., "Parallel Artificial Membrane Permeability Assay for Blood-Brain Permeability Determination of Illicit Drugs and Synthetic Analogues"**,** *Sci. Justice*., 54 (2014) 351-355.

Walton, B.L.; Verbeck, G.F., "Soft-Landing Ion Mobility of Silver Clusters for Small Molecule MALDI-MS and Imaging of Latent Fingerprints", *Anal. Chem.*, 86 (2014) 8114-8120.

Huynh, V; Joshi, U.; Leveille, J.M.; Golden, T.D.; Verbeck, G.F., "Nanomanipulation-Coupled to Nanospray Mass Spectrometry Applied to Document and Ink Analysis", *For. Sci. Int.* 242 (2014) 150-156.

Walton, B.L.; Hoffmann, W.D.; Verbeck, G.F.; "Sub-eV Ion Deposition Utilizing Soft-Landing Ion Mobility for Controlled Ion, Ion Cluster, and Charged Nanoparticle Deposition", *Int. J. Mass Spectrom.*, 370 (2014) 66.

Clemons, K; Nnaji, C.; Verbeck, G.F., "Overcoming Selectivity and Sensitivity Issues of Direct Inject Electrospray Mass Spectrometry via DAPNE-NSI-MS"**,** *J. Amer. Soc. Mass Spectrum*., 25 (2014) 705. **Invited.**

Elfakhani, M.; Torabi, S.; Hussein, D.; Mills, N.; Verbeck, G.F.; Mo, H., "Mevalonate deprivation mediates the impact of lovastatin on the differentiation of murine 3T3-F442A preadipocytes", *Experimental Biology and Medicine,* 239 (2014) 293-301.

Walton, B.L.; Joshi, U.; Dzuba, S.; Youngblood, W.J.; Verbeck, G.F., "Imidazolium Salts with Varying Anions as Charge Carriers for Detection of Neutral Bis(triphenylphosphine) Palladium(II) Dichloride in Electrospray Ionization Mass Spectrometry", *Rapid Comm Mass Spectrom.*, 15 (2013) 1954-60.

Clemons, K.; Dake, J.; Sisco, E.; Verbeck, G.F.; "Trace analysis of energetic materials via direct analyte-probed nanoextraction coupled to direct analysis in real time mass spectrometry", *For. Sci. Int.*, 231 (2013) 98.

Hoffmann, W.D.; Verbeck, G.F.; "Toward a Reusable SERS Substrate by Soft-Landing Ion-Mobility", *App. Spect.*, 67 (2013) 656.

Clemons, K.; Wiley, R.; Waverka, K.N.; Fox, J.D.; Dziekonski, E.; Verbeck, G.F.; "Direct Analyte Probed Nanoextraction (DAPNe)-coupled to Nanospray Ionization-Mass Spectrometry of Drug Residues from Latent Fingerprints", *J. For. Sci.,* 58 (2013) 875.

Jones, J.D.; Morris, C.; Verbeck, G.F.; Perez, J.M.; "Oxidative Pit Formation in Pristine, Hydrogenated and Dehydrogenated Graphene", *Applied Surface Science*, 264 (2013) 853.

Hoffmann, W.D.; Walton, B.L.; Verbeck G.F.; "Soft-Landing Preparative Mass Spectrometry", **Review Article**, *Analyst*, 137 (2012) 4393. **Invited**

Jones, J.D. Shah, R.K.; Verbeck, G.F.; Perez, J.M.; "The Removal of Single Layer from Multi-Layer Graphene by Low Energy Electron Bombardment", *Small, 8* (2012) 1066.

Horn, P.J.; Hoffmann, W.D. Behrendt, A.K.; Chapman, K.D.; Verbeck, G.F.; "Liquid-Phase Microextraction and Controlled Emitter Tip Chemistry-Coupled to Nanospray Mass Spectrometry for Direct Lipid Analysis", *Rapid Comm. Mass Spect.,* 26 (2012) 957.

Fox, J.D.; Waverka, K.; Verbeck, G.F.; "Gold-Plating of Mylar Lift Films to Capitalize on Surface Enhanced Raman Spectroscopy for Chemical Extraction of Drug Residues", *For. Sci. Int.*, 216 (2012) 141.

Barst, B; Gevertz, A; Chumchal, M; Smith, J; Rainwater, T; Drevnick, P; Hudelson, K; Hart, A; Verbeck, G; Roberts, A.; "Laser Ablation ICP-MS Co-localization of Mercury and Immune Response in Fish", *Environmental Science & Technology*", 45 (2011) 8982.

Hadjar, O.; Schlatholter, T.; Davila, S.; Catledge, S.A.; Kuhn, K.; Kassan, S.; Kibelka, G.; Cameron, C.; Verbeck, G.F., *" IonCCD for Scan-Free Sector-Field Instruements: KeV ion Detection Induced Peak Shape and Detector Surface Artifacts"*, J. Am. Soc. Mass Spectrom, 22 (2011) 1872.

Wallace, N.M.; Hueske, E.Verbeck, G.F., *"Ultra-Trace Analysis of Illicit Drugs from Transfer of Electrostatic Lift"*, Sci. Jus., 51 (2011) 196.

Horn, P.J.; Ledbetter, N.R.; James, C.N.; Hoffmann, W.D.; Case, C.R.; Verbeck, G.F.; Chapman, K.D., *"Visulization of Lipid Droplet Composition by Direct Organelle Mass Spectrometry"*, J. Biol. Chem., 286 (2011) 3298.

Jones, J.; Hoffmann, W.D.; Jesseph, A.V.; Verbeck, G.F.; Perez, J.M., "*On the mechanism for plasma hydrogenation of Graphene*", Appl. Phys. Lett., 97 (2010) 233104.

Ledbetter, N.R.; Walton, B.; Davila, P.; Hoffmann, W.D.; Ernest, R.; Verbeck, G.F., *"Nanomanipulation-Coupled Nanospray Mass Spectrometry Applied to the Extraction and Analysis of Trace Analytes Found on Fibers"*, J. Forensic Sci., 55 (2010) 1218.

Jesseph, A. V.; Fox, J.D.; Verbeck, G.F., "*Ion isolation and collision-induced dissociation in a 0.5 mm ro cylindrical ion trap."* Int. J. Mass Spectrum., 295 (2010) 149.

Davila, S.J.; Birdwell, D.O.; Verbeck, G.F., *"Drift tube soft-landing for the production and characterization of materials: Applied to Cu clusters."* Rev. Sci. Inst., 81 (2010) 034104.

Brown, J. M.; Hoffmann, W.D.;Alvey, C.M.; Wood, A.R.; Verbeck, G.F., Petros, R. "OBOC Peptide Library Sequencing via High-Pressure Ammonia Cleavage Coupled with Nanomanipulation/Nanospray Mass Spectrometry*" Anal. Biochem* 398 (2010) 7

Fox, J.D.; Tsui, K.; Saini, R., **Verbeck, G.F** "MEMS Assembled Ion Optics: An Advance to Minaturization and Assembly of Electron and Ion Optics*",Rev. Sci. Inst*., 80 (2009) 093302.

Xu, Jun; Whitten, W. B.; Ramsey, J. M.; Verbeck, G., "Study of ample interference in single-pulse ionization miniature IMS.", 2004, *Int. J. Ion Mob. Spectrom.*, 7(2), 15-21.

Verbeck, G.F.; Ruotolo, B.T.; Gillig, K.J.; Russell, D.H., "Resolution Equations for High-Field Ion Mobility", 2004, *J. Am. Soc. Mass Spectrom.*, 15, 1320-1324.

Verbeck, G.F.; Gillig, K.J.; Russell, D.H., "Variable-Temperature Ion Mobility Time-of-Flight Mass Spectrometry Studies of Electronic isomers of Kr^{2+} and CH_3OH^+ Radical Cations" 2003, *Eur. J. Mass Spectrom.*, 9, 579-587.

Ruotolo, B.T.; Verbeck, G.F.; Thomson, L.M.; Woods, A.S.; Gillig, K.J.; Russell, D.H., "Distinguishing Between Phosphorylated and Non-phosphorylated Peptides with Ion Mobility-Mass Spectrometry", 2002, *J Proteome Res.*, 1(4), 303-306

Verbeck, G.F.; Ruotolo, B.T.; Sawyer, H.A.; Russell, D.H., "A Fundamental Introduction to Ion Mobility Mass Spectrometry Applied to the Analysis of Biomolecules", 2002, *J Biomol. Tech.*, 13(2) 56.

Ruotolo, B.T.; Verbeck, G.F.; Gillig, K.J.; Russell, D.H., "Observation of Conserved Solution-Phase Secondary Structure in the Gas-Phase Tryptic Peptides", 2002, *JACS*, 124(16) 4214.

Verbeck, G.F.; Ruotolo, B.T.; Gillig, K.J.; Russell, D.H., "A Biological Application of Probing Structural Differences Using Ion Mobility Mass Spectrometry: An Introduction", 2001, *J Biomol. Tech.*, 12(4) 89.

Sawyer, H.A.; Ruotolo, B.T.; Marini, J.T.; Verbeck, G.F.; Gillig, K.J.; Russell, D.H., "Cesium-ion Adduction and Cooperative Binding Effects on Peptide Conformation as Probed by Ion Mobility-Mass Spectrometry" 2001, *J Biomol. Tech.*, 12(4) 114.

Verbeck, G.F.; Beale, S.C., "Isoelectric Point Analysis of Proteins and Peptides by Capillary Isoelectric Focusing with Two-Color Laser-Induced Fluorescence Detection", 1999, *J Microcolumn Sep.*, 11(10) 708-715.

Book Chapters:

Phelps, M.S.; Verbeck, G.F., *Analysis of Lipids in Single Cells and Organelles Using Nanomanipulation-Coupled Mass Spectrometry*, Chapter 3, Single Cell Metabolism: Methods and Protocols, Editor Shrestha, B., ISBN 978-1-4939-9831-9, Methods in Molecular Biology 2064, Humana Press, Springer Nature, 2019

Mach, P.M.; Verbeck, G.F., *Analytical Methods and Trends in Environmental Forensics*, Chapter 11, Development and Environment, ISBN 978-3-319-75933-3, Springer International Publishing, Switzerland, 2018.

Patents:

Wright, K.C.; Verbeck, G.F., *Chemical Analyzer with Membrane***,** Patent No. 10,985,000, April 20, 2021.

Verbeck, G.F.; Davila, S., *Controlled Deposition of Metal and Metal Cluster Ions by Surface Field Pattering in Soft-Landing Devices,* Patent No. 10,876,202 B2, December 29, 2020bv.

Verbeck, G.F.; Redmond, J.; Wing, T. *Techniques for Rapid Detection and Quantitation of Volatile Organic Compounds (VOCs) using breath samples*, Patent No. 10,813,585 Oct, 2020. **EXECUTED**

Verbeck, G.F.; Rafferty, D.; Wylde, J.; Spencer, M., *Method for Detecting Organic and Inorganic Explosives*, Patent No. 09804141B2, October, 2017. **EXECUTED**

Verbeck, G.F.; Davila, S., *Controlled Deposition of Metal and Metal Cluster Ions by Surface Field Pattering in Soft-Landing Devices,* Patent No. 09574263 B2, February 21, 2017.

Verbeck, G.F., *Nanomanipulation-Coupled to Mass Spectrometry (III),* Patent No. 09218947 B2, December 22, 2015.

Verbeck, G.F., *Nanomanipulation-Coupled to Mass Spectrometry (II),* Patent No. 08829431 B2, September 9, 2014.

Verbeck, G.F., *Nanomanipulation-Coupled to Mass Spectrometry (I),* Patent No. 08766177, July 1, 2014.

Verbeck, G.F.; Davila, S., *Controlled Deposition of Metal and Metal Cluster Ions by Surface Field Pattering in Soft-Landing Devices,* Patent No. 08651048, February 18, 2014.

Verbeck, G.F.; Davila, S., *Silver and Silver Nanoparticle MALDI Matrix Utilizing Online Soft-Landing Ion Mobility,* Patent No. 08610058, December 17, 2013.

Verbeck, G.F., Hoffmann, W. *Petroleum Analysis Using Liquid Nitrogen Cold Stage Laser Ablation ICP Mass Spectrometry,* Patent No. 08586943, November 19, 2013.

Verbeck, G.F.; Whitten, W.B.; Moxim, J. *Controlled kinetic energy ion source for miniature ion trap and related spectroscopy system and method* Patent No. 07838820, Issued November 23, 2010. **EXECUTED.**

Verbeck, G.F.; Kenneth Tsui. *On-Chip Reflectron and Ion Optics* Patent No. 07605377, Issued October 20, 2009

Patent Applications:

Verbeck, G.F., *Standoff Detection of Disease and Virus Metabolites using Environment Air Capture-Coupled to a tunable Membrane Inlet Mass Spectrometer***,** UNTP.P0028US.P1/1001120240., April 2020. **EXECUTED**

Verbeck, G.F., *Remote Smell Technology*, August 29, 2017.

Verbeck, G.F., *Dynamic Reverse Gas Stack Model for Portable Chemical Detection Devices to Locate Threat and Point-of-Source from Effluent Streams,* PCT/US16/56601 October, 2016. **EXECUTED**

Verbeck, G.F., *Metal Abaltion in a Supersonic Expansion Gas-Coupled to an Ion Mass Filter*, Provisional 61418680, December, 2010

Verbeck, G.F., *Applications of Hydrogen Gas Getters in Mass Spectrometry***,** Patent App. No. 20100163724, July 1, 2010.

Cordell,A.; Verbeck, G.F., *RF Coil Plasma Generation* Patent App. No. 20080078745, April 3, 2008.

Verbeck, G.F.; Cordell, A., *RF Coil Plasma Generation* Patent App. No. 20080078506, April 3, 2008.

Verbeck, G.F.; *Coaxial Ring Ion Trap* Patent App. No. 20080017794, January 24, 2008.

Book Reviews:

Verbeck, G.F.; *Book Review of Practical Aspects of Trapped Ion Mass Spectrometry, Volume V: Applications of Ion Trapping Devices***,** J. Amer. Chem. Soc., 133 (2011) 18002.

Verbeck, G.F.; *Book Review of Practical Aspects of Trapped Ion Mass Spectrometry, Volume IV: Theory and Instrumentation***,** J. Amer. Chem. Soc., 133 (2011) 14839.

Workshops:

Verbeck, G.F., *"Analysis of Oil and Tar Sand Products with Laser Ablation ICP-MS"*, Refining and Petrochemical Seminar, Bruker, June 2011.

Verbeck, G.F., *"Nanomanipulation-Coupled to Microfluidics and Nanospray Mass spectrometry: Bringing the Mass Spectrometer to the Sample"* Laboratory Productivity Workshop, ThermoScientific, Austin, TX, May 2011.

Verbeck, G.F., *" Capillary Column GC-MS for the Analysis of Oil and Gas: Probing New Oil Sources from Lignite Coal to Tar Sands"* Laboratory Productivity Workshop, ThermoScientific, Austin, TX, May 2011.

Verbeck, G.F., "*Nanomanipulation-Coupled to Nanospray Mass Spectrometry: A New Tool for Single Organelle Analysis , Liquid Phase Microextraction, and Combinatorial Applications"* Integrative Biosystems Institute Workshop, Complex Systems Analytics, Ga Tech, April 2011.

Verbeck, G.F. "*Fundamentals of Mass Spectrometry Applied to Trace Forensic Analysis"*, Southwestern Association of Forensic Scientist 2010 Annual Meeting and Training Conference, Grapevine, TX, September 2010.

Presentations:

Verbeck, G.F., *Direct Analyte Probe Nanoextraction (DAPNe) and Nanoparticle Deposition-coupled to MALDI to exact chemical metabolic pathways in True One-Cell (TOC) analysis,* 3rd Iberoamerican Conference on Mass Spectrometry, Rio De Janeiro, Brazil, December 2022, KEYNOTE.

Verbeck, G.F., *Breath Markers of Disease Identifiers for Portable Mass Spectrometry* 14th Harsh Environment Mass Spectrometry Workshop, Cocoa Beach, FL., October 2022, INVITED.

Verbeck, G.F., *The Determination of Breath Biomarkers for Disease and Health Identifiers to Create a Non-Invasive Rapid Screen using Portable Mass Spectrometry* Aviation Health 2022, Paris, France, September, 2022, INVITED

Verbeck, G.F., *Using Direct Analyte Probe Nanoextraction (DAPNe) and Nanoparticle Deposition-coupled to MALDI to exact chemical information from one cell and one organelle* Department of Chemistry IUPUI, Indianapolis, IN, February, 2022, INVITED.

Verbeck, G.F., *The determination of breath biomarkers and metabolites for disease and health constituents using non-invasive direct inject mass spectrometry*, Breath Biopsy Conference 2021, October 2021. INVITED.

Verbeck, G.F., *Instrumental Techniques for Fentanyl and Opioids*, SWAFS 2021, San Antonio, TX October 2021, INVITED.

Verbeck, G.F., *Paperspray coupled to Mass Spectrometry*, Spring 2020 DEA Lecture Series Chromatographic Tips, Tricks, and Troubleshooting, Dallas, TX March 2020, INVITED

Verbeck, G.F., *Using Direct Analyte Probe Nanoextraction (DAPNe) and Nanoparticle Deposition-coupled to MALDI to exact chemical information from one cell and one organelle*. Department of Chemistry: Missouri S&T, Rolla, MO, February 2020, INVITED.

Verbeck, G.F., *New Designs in Mass Spectrometry: From One-Cell Analysis to Field Portability*. Department of Chemistry: University of Texas at Dallas, Richardson, TX. January 2020, INVITED

Verbeck, G.F., *The Chemistry of Nano-Collection*, Association of Forensic Document Examiners Symposium, Denton, TX., October 2019, INVITED.

Verbeck, G.F., *Chemical Smart City and Where HEMS can Play a Role*, 13th Harsh Environment Mass Spectrometry Workshop, Myrtle Beach, S.C., September 2019, INVITED.

Verbeck, G.F.; *New Technology in Forensic Science and Issues for Transition into Practice*, North Texas MENSA CybeRG, Addison, TX, November 2018, INVITED.

Verbeck, G.F.; Anguiano Virgen, C.; Wright, K.C.; Winfield, J.L.; Fox, J.D., *Reverse-gas stack modeling-coupled to fieldable mass spectrometry to locate chemical effluent streams for clandestine drug labs, explosives manufacturing, and chemical weapon deployment*, 12th Harsh Environment Mass Spectrometry Workshop, Cologne, Germany, October 2018, INVITED.

Verbeck. G.F.; *A Workshop and Demo for Proper Method Development and Instrument Fundamentals in Forensic Applications*, SWAFS 2018, Shreveport, LA, October 2018, INVITED.

Verbeck, G.F.; *Fundamentals of MS and Hyphenated Techniques Applied to Drugs, Explosives, and Bioterrorism***,** SWAFS 2017, Fort Worth, TX, October 2017, INVITED.

Verbeck, G.F.; Smith, N.R.; McBride, E.M.; Mach, P.M.; Wright, K.C.; Winfield, J.L., *Rapid Response Fieldable Mass Spectrometry with Reverse Gas Stack Modeling and Earth-Based Separations*, 11th Harsh Environment Mass Spectrometry Workshop, Oxnard, CA, September 2017.

Verbeck, G.F.; *Using Direct Analyte Probe Nanoextraction-coupled to Mass Spectrometry to Probe Metabolite Differences between Healthy and Cancerous States at the One Cell Level,* Clinical Research to Precision Medicine: Translating Biological Investigations into Healthcare Possibilities, Thermo Scientific Annual Users' Meeting, ASMS 2017, Indianapolis, IN, June 2017, INVITED.

Verbeck, G.F.; Mach, P.M.; Wright, K., *Monitoring Air Quality While Going 70 mph: Earth Based Separations using Reverse Gas Stack Model for Localization of Chemical Effluent Utilizing Mobile Mass Spectrometry,* Responsible Shale Energy Extraction 2017, Earth Day TX 2017, Dallas, TX, April 2017, INVITED.

Verbeck, G.F.; *Softlanding Ion Mobility coupled to MALDI for Direct Deposition of Matrix Size Selected Metal Nanoparticles*, Asilomar Conference on Mass Spectrometry and Mass Mobility, Asilomar, CA, October 2016, INVITED.

Verbeck, G.F., Wright, K.; *From the lab to the field: taking mass spectrometry out of its element and into the harsh environment*, 43rd Meeting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2016, Minneapolis, MN, September 2016, INVITED.

Verbeck, G.F., *True one-cell chemical analysis: Using direct analyte probe nanoextraction-coupled to mass spectrometry to probe chemical differences between healthy and cancerous cells.* Department of Chemistry, Texas Lutheran University, October 2016.

Verbeck, G.F., *True one-cell chemical analysis: Using direct analyte probe nanoextraction-coupled to mass spectrometry to probe chemical differences between healthy and cancerous cells.* Department of Chemistry, Trinity University, October 2016.

Verbeck, G.F., *True one-cell chemical analysis: Using direct analyte probe nanoextraction-coupled to mass spectrometry to probe chemical differences between healthy and cancerous cells.* Hamon Center for Therapeutic Oncology Research & Simmons Cancer Center Experimental Therapeutics Program, University of Texas-Southwestern, May 2016.

Verbeck, G.F., *Introduction of a Multi-optic Coaxial Ring Ion Trap (MoCRIT) for External Ionization in Portable Mass Spectrometry*, Pittcon, Atlanta, GA, March 2016, **Invited**

Verbeck, G.F.; Mach, P.; Aguilar, R., *Testing the Air and Water Quality of the Cape Horn Biosphere Reserve with Portable MEMS System,* Seminaro: Calidad De Las Aguas en Magallanes, American Corner, UMAG, Punta Arenas, Chile, December 2015.

Verbeck, G.F., *True "One-Cell" Chemical Analysis using Nanomanipulation coupled to Mass Spectrometry,* Illinois State University, October, 2015.

Verbeck, G.F.; Jackson, G., *Mass Spectrometry Instrumentation at the Forefront of*

Technology as Miscible Tools for Forensic and Security Evidence, Forensics and Homeland Security Interest Group, 63rd ASMS Conference on Mass Spectrometry and Allied Topics, St. Louis, MO, June 2015.

Verbeck, G.F., *TiRaNI Bioworkstation: Single Cell Analysis at the Cancer Forefront***,** University of Copenhagen, School of Pharmacy, Copenhagen, Denmark, April 2015.

Verbeck, G.F., *Raman Imaging and Nanomanipulation-Coupled to Mass Spectrometry to Exact the Chemistry of Inks with Minimal to No Analysis Footprint*, 2015 International Security Printers Conference, Copenhagen, Denmark, April 2015, INVITED.

Verbeck, G.F., *Effective Identification of Ink and Document Chemistries using Nanomanipulation-Coupled to Mass Spectrometry for Forensic Applications*, It's a Small World: How Collaboration Leads to Innovative Research, 2015 Forensic Science R&D Grantees Meeting Agenda, Orlando, FL, February 2015, INVITED.

Verbeck, G.F., *Trace Analysis of Illicit Chemistries using Direct Analyte Probe Nanoextraction (DAPNe)*, Sanibel Conference on Security and Forensic Applications of Mass Spectrometry, Clearwater Beach, FL, January 2015, INVITED.

Huynh, V.; Williams, K. C.; Golden, T. D.; Verbeck, G. F., , *"Forensic application of nanomanipulation applied to document inks"*, Southwest Regional Meeting, American Chemical Society, Fort Worth, TX, November 2014

Verbeck, G.F., *"Nanomanipulation: Identification of Fraudulent Documents through Analysis of Ink, Paper, Paint, and other Counterfit Materials"*, Document Security Alliance Meeting, Washington, D.C., October 2014, INVITED.

Verbeck, G.F., *Deployable Remote Miniature Cylindrical Ion Trap Mass Spectrometer (ReMiCIT): The Pathway to Manufacturing of Smaller Mass Spectrometry and Vacuum*., Waters, Manchester, England, August 2014, INVITED.

Verbeck, G.F., *Softlanding Ion Mobility (SLIM) for Deposition of Controlled Size and Distribution of Metal Nanoparticles for SERS Imaging Applications* International Conference on Raman Spectroscopy, ICORS 2014, Jena, Germany, August 2014.

Verbeck, G.F., *Nanomanipulation-Coupled to Nanospray Mass Spectrometry: A New Tool for Single Organelle Analysis , Liquid Phase Microextraction, and Combinatorial Applications Leading to Applications in Metabolic Disease and Cancer Research*, Southwest Regional Meeting of American Chemical Society, SWARM 2013, Waco, TX, November 2013, INVITED.

Verbeck, G.F., *A nanomanipulation, probing station coupled to mass spectrometry for applications in expeditionary laboratories.*, 40th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2013, Milwaukee, WI, September 2013, INVITED.

Verbeck, G.F., *Deployable Remote Miniature Cylindrical Ion Trap Mass Spectrometer (ReMiCIT),* Pittcon, Philadelphia, PA, March 2013, INVITED.

Verbeck, G.F., *Direct Injection Mass Spectrometry for Nondestructive Forensic Chemical Analysis and Tracking of Chemistry Networks from Source to User*, 39th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2012, Kansas City, MO, October 2012. INVITED

Verbeck, G.F.; Fox, J.D*., Raman Imaging and Microscopy-Coupled to Direct Analyte Probe Nano-Extraction Nanospray-Mass Spectrometry for Quantitative and Qualitative Analysis of Localized Chemistries*, International Conference on Raman Spectroscopy, ICORS 2012, Bangalore, India, August 2012. INVITED

Moore, B.; Cook, N.; Rushing, H.; Cooper, J.; Brinkman,E.; Roberts, A; Smith, J.; **Verbeck, G.**; Chumchal, M., *Mercury bioaccumulation and associated liver pathologies in spotted gar*, Gordon Research Conference, Environmental Endocrine Disruptors, West Dover, VT, June 2012

Verbeck, G.F. "*Deployable Remote Miniature Cylindrical Ion Trap Mass Spectrometer (ReMiCIT)"*, 38th Federation of Analytical Chemistry and Spectroscopy Societies, Reno, NV, October 2011. INVITED

Marini, J.T.; McDonald, S.; Wrona, M.D.; Liu, X.; Junga, H.; Egnash, L.A.; McKenzie, D.L.; **Verbeck, G.F**., "Differentiating Regioisomers of Hydroxylated Drug Metabolites with a High Resolution QTOF with Enhanced Ion Mobility Capabilities", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Hadjar, O.; Schlathoelter, T.; Davila, S.J,; Kibelka, G.; Kassan, S.; Cameron, C.; Kuhn, K,; **Verbeck, G.F.,** "*IonCCD for Non-Scanning Sector Field Instruments: from KeV Ion to Image Charge Detection*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Jin, F.; **Verbeck, G.F.;** Jackson, G.P., "*Development of a Portable Mass Spectrometer for Operation at 1 Torr*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Verbeck, G.F. "*2071.015 Supersonic Expansion-Coupled to Softlanding Mass Spectrometry for the Combing, Deposition, and Interrogation of New Dielectric Materials*", Semiconductor Research Corporation-CEMPI Program Review, Denton, TX, November 2010.

Verbeck, G.F. "*A new segmented rectilinear ion trap with modified smalley nozzle for creation of new catalysts and dielectric materials"*, 37th Federation of Analytical Chemistry and Spectroscopy Societies, Raleigh NC, October 2010. INVITED

Verbeck, G.F.; "*Development of Novel Preparative Mass Spectrometry Instrumentation for the Advancement of Tribological Materials for Dynamic MEMS***",** Commercialization of Micro and Nano Systems Conference 2010, Albuquerque, NM, August-September 2010.

Verbeck, G.F. , Davila, S.J,; Birdwell, D.O. **"***Soft-landing Ion Mobility (SLIM): Low-Field and High-Field Ion Mobility to Separate, Elucidate, and Land Ions for Novel Preparative Materials"*, 19th International Conference on Ion Mobility Spectrometry, Albuquerque, NM, July, 2010

Verbeck, G.F. *"MEMS Assembled Ion Source and Portable Mass Spectrometry"*, Biometrics and Forensic Summit, San Diego, CA, March 2010.

Verbeck, G.F. *"Fabrication and implementation of micro and nano ion optics utilizing silicon-on-insulator, deep reactive ion etching for portable mass spectrometry"*, Pittcon, Orlando, FL, March 2010. INVITED

Verbeck, G.F.; Davila, S. J., *" Surface Deposition and Characterization of Cu Clusters"*, American Vacuum Society 56th Annual Symposium, San Jose, CA, November 2009.

Verbeck, G.F., "*Nanomanipulation-Coupled to Nanospray Mass Spectrometry in Forensic Applications: A Direct Sampling Method*", 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009. INVITED

Golden, T.D.; Joshi, U.; **Verbeck, G.F.,** "*Nanomanipulation-Coupled to Nanospray Mass Spectrometry Applied to Document and Ink Analysis"*, 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009.

Verbeck, G.F., "*Ion Mobility – Softlanding for Characterization and Isolation of Nanoclusters"*, 36th Federation of Analytical Chemistry and Spectroscopy Societies, Louisville, KY, October 2009. INVITED

Verbeck, G.F., *" Nanomanipulation-coupled to Nanospray Mass Spectrometry: Combinatorial Applications and Single Organelle Analysis",* 36th Federation of Analytical Chemistry and Spectroscopy Societies, Louisville, KY, October 2009. INVITED

Verbeck, G.F., Rafferty, D. "*Achievable Resolution and Efficiency of Tandem Mass Spectrometry for Sub-mm Ion Traps"*, 7th Workshop on Harsh-Environment Mass Spectrometry, Santa Barbara, CA, September 2009. INVITED

Verbeck, G.F. "*Novel IM Applications to Softlanding and Portable Mass Spectrometry"*, ASMS Ion Mobility Workshop, 57th ASMS Conference on Mass Spectrometry, Philadelphia, PA, June, 2009. INVITED

Verbeck, G.F., "Development of a Novel Preparative Mass Spectrometry Instrumentation for the Advancement of New Materials and Nanofabrication", AFOSR Surface and Interfacial Science Portfolio Annual Review, Arlington, VA, January 2009.

Verbeck, G.F., "Introduction to International Studies at the University of North Texas*",* United States Embassy, Kigali, Rwanda, December 2008.

Verbeck, G.F., "MEMS Mass Spectrometers and Ion Optical Devices: The Future of Field-Portable Instrumentation*",* SREDI 2008, Scientific Research, Development and Innovations Conference, Kigali, Rwanda, December 2008.

Verbeck, G.F., Maxwell, R.C.; Birdwell, D.O., "Effects of Materials, Space-Charge, Surface-Charge, and Aberrations on Performance for Miniature Mass Spectrometry", 56th ASMS Conference on Mass Spectrometry, Denver, CO, June, 2008.

Verbeck, G.F., "MEMS Assembled Ion Optical Devices: Current Technology and a Look at Advantages and Disadvantages" 6th Workshop on Harsh-Environment Mass Spectrometry, Cocoa Beach, FL, September 17-20, 2007.

Verbeck, G.F.; Geisberger, A..; Saini, R.; Tsui, K.; Ellis, M., "MEMS Assembled Devices: A Fresh Advance to Miniaturization and Assembly of Spectrometers and Electron and Ion Optics" Commercialization of Micro and Nano Systems Conference 2006, St. Petersburg, FL, August 28-31, 2006.

Verbeck, G.F.; Saini, R.; Wylde, J.W.; Tsui, K., Ellis, M., "MEMS Assembled Mass Spectrtometry: A Novel Approach to Miniaturization and Construction of Electron and Ion Optics" 54th ASMS Conference on Mass Spectrometry, Seattle, WA, May 28-June 1, 2006.

Whitten, B; Hayes, S; Verbeck, G; Moxom, J; Begovich, J; Carter, J; Whitaker, M; Annese, C. "Micro mass spectrometry: a modern technology tool to address the proliferation of weapons of mass destruction." 46th Annual Meeting Proceedings of the Institute of Nuclear Materials Management 2005.

Verbeck, G.F.; Moxom, J.; Whitten, W.B., "Resistive Glass Drift Tube Used to Inject Externally Formed Ions into a Submillimeter Ion Trap" 53rd ASMS Conference on Mass Spectrometry, San Antonio, TX, June 5-9, 2005.

Moxom, J.; Verbeck, G.F.; Whitten, W.B., "Miniaturization of Mass Spectrometers Based on Submillimeter Cylindrical Ion Traps" 53rd ASMS Conference on Mass Spectrometry, San Antonio, TX, June 5-9, 2005.

Verbeck, G.F. "Development of a Hand Portable Mass Spectrometer for Homeland Security and Nonproliferation/Safeguards Applications" Detector/Sensors Research and Technology for Homeland and National Security, Gatlinburg, TN, September 14-16, 2004.

Verbeck, G.F.; Russell, D.H., "Resolution Equations Revisited for Both High-Field and Low-Field Ion Mobility", 13th International Conference on Ion Mobility Spectrometry, Gatlinburg, TN, United States, July 25-29, 2004.

Whitten, W.B.; Reilly, P.T.; Ramsey, J.M.; Verbeck, G.F.; Xu, J., "IMS-High Pressure ITMS", 13th International Conference on Ion Mobility Spectrometry, Gatlinburg, TN, United States, July 25-29, 2004.

Xu, J.; Verbeck, G.F.; Whitten, W.B.; Ramsey, J.M., "Study of Pulse Ionization Miniature Ion Mobility Spectrometry", 13th International Conference on Ion Mobility Spectrometry, Gatlinburg, TN, United States, July 25-29, 2004.

Verbeck, G.F.; Russell, D.H., "The application of a nitrogen-cooled ion mobility time-of-flight mass spectrometer to the separation of the conventional and distonic radical cations of CH_3OH", 19th ANZSMS Conference, Lorne, Australia, February 2-6, 2003.

Steelman, K.L.; Verbeck, G.F.; Rowe, M.W., "Little Lost River Cave, Idaho: Ion cyclotron resonance and electrospray ionization mass spectrometry of a deposit associated with pictographs ", Abstracts of Papers, 222nd ACS National Meeting, Chicago, IL, August 26-30, 2001.

Ruotolo, B.T.; Gillig, K.J.; Stone, E.G.; Verbeck, G.F.; Russell, D.H., "The Search for Novel Peptides: A New Application for Ion Mobility-Mass Spectrometry", 49th ASMS Conference on Mass Spectrometry, Chicago, IL, May 2001.

Sawyer, H.A.; Ruotolo, B.T.; Verbeck, G.F.; GIllig, K.J.; Stone, E.G.; Russell, D.H., "Cesium-Ion Adduction and Cooperative Binding Effects on Peptide Conformation as Probed by Ion Mobility-Mass Spectrometry", 49th ASMS Conference on Mass Spectrometry, Chicago, IL, May 2001.

Peterman, S.M.; Verbeck, G.F.; Russell, D.H., "Study of Competing Reactions: Direct Dissociation vs. Isomerization Reactions of the $C_8H_8O_2^{+*}$ Ions Formed from Methyl Benzoate", 49th ASMS Conference on Mass Spectrometry, Chicago, IL, May 2001.

Verbeck, G.F.; Peterman, S.M.; Russell, D.H., " The Study of $C_8H_8O_2^{+*}$ Chemistry from Methyl Benzoate using and *In Situ* Infrared Emitter" The North American FT-ICR MS Conference, Austin, TX, March 2001.

Verbeck, G.F. and Beale, S.C., " Analysis of Proteins and Peptides Using Two-Color Laser Induced Fluorescence Detection Capillary Electrophoresis", Sigma Xi Graduate Research Day, University of Alabama at Birmingham, Birmingham, AL, April 1998.

Verbeck, G.F. and Beale, S.C., "Analysis of Proteins and Peptides by Capillary Electrophoresis Using Two-Color Laser Induced Fluorescence Detection", 75th Meeting of the Alabama Academy of Science, University of South Alabama, Mobile, AL, March 1998.

Verbeck, G.F., Yang, Z., Beale, S.C., "Capillary Electrophoresis with Laser-Induced Fluorescence Detection for Proteins and Peptides", 1998 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1998.

Verbeck, G.F. and Beale, S.C., "Analysis of Proteins and Peptides by Capillary Electrophoresis Using Two-Color Laser Induced Fluorescence Detection", 1998 Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA, March 1998.

Verbeck, G.F. and Beale, S.C., "Protein Molecular Weight Analysis Using Two-Color Laser Induced Fluorescence Detection Capillary Gel Electrophoresis", HPCE '98, Orlando, FL, January 1998.

Student Presentations:

Reyes, K. De Silva, I.W.; Verbeck, G.F., *Using Paperspray Mass Spectrometry to Measure Viral Markers from Tissue and Serum,* 70th ASMS Conference on Mass Spectrometry and Allied Topics, June 2022.

Emadi, C.; Bonatesta, F.; Nayek, S.; Verbeck, G.; Meager, E. *Effects of Co-Exposure to Hypoxia and Lead on Daphnia magna*, SETAC South Central Regional Chapter Annual Meeting, April 2021.

Emadi, C.; Bonatesta, F.; Nayek, S.; Verbeck, G.; Meager, E. *Acute Effects of Co-Exposure to Hypoxia and Lead on the Cladoceran, Daphnia magna*, SETAC SciCon2, November 2020.

Virgen, C.A.; Gunrung, S.; Murphy, D.; Dubansky, B.; Verbeck, G.F., *Crude Oil Exposure Of Fundulus Grandis For The Quantification And Detection Of Airborne Aromatic Compounds Via Membrane Inlet Mass Spectrometry,* 68th ASMS Conference on Mass Spectrometry and Allied Topics, Online, June 2020.

De Silva, I.W.; Kiselak, T.D.; Couch, A.N.; Castillo, C.; Verbeck, G.F., *Detection Of Chemical Residues, Metabolites And Gaseous Capture Utilizing A Microporous Polyolefin Silica-Based Substrate For Paper Spray Mass Spectrometry,* 68th ASMS Conference on Mass Spectrometry and Allied Topics, Online, June 2020.

Nayek, S. De Silva, I.W.; Lund, A.; Verbeck, G.F., *Liver Toxicity And Alteration Of Renin-Angiotensin System (RAS) Components Induced By Silver Nanoparticle Exposure In Wistar Rats* 68th ASMS Conference on Mass Spectrometry and Allied Topics, Online, June 2020.

De Silva, I.W.; Duncan, R.S.; Koulen, P.; Verbeck, G.F., *Nanomanipulation-Coupled MALDI Imaging Mass Spectrometry for Single Organelle Analysis to Measure Metabolic Changes responding to Oxidative Stress in Neuroblastoma Cells,* 67th ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta, GA, June 2019.

Kiselak, T.D.; De Silva, I.W.; Claassen, A.; Verbeck, G.F.; *Organic Synthesis Reaction Monitoring of a Fentanyl Synthesis using a Microporous Polyolefin Silica Substrate for Paper Spray Mass Spectrometry,* 67th ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta, GA, June 2019.

Anguiano Virgen,C.; Fox, J.D.; Winfield, J.L.; Wright, K.C.; Verbeck, G.F.; *Detection and Analysis of Simulated Chemical Warfare Agents via Portable Mass Spectrometry,* 67th ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta, GA, June 2019.

Nayek, S.; Verbeck, G.F.; *Toxicological and Biochemical changes induced by sub-acute exposure of Wistar Rats to Silver Nanoparticles using Soft Landing Ion Mobility Instrument*, 67th ASMS Conference on Mass Spectrometry and Allied Topics, Atlanta, GA, June 2019.

Anguiano Virgen, C.; Verbeck. G.F.; *Portable Mass Spectrometry Detection and Analysis of Clandestine Fentanyl Laboratories Via Earth-Based Separation*, SACNAS 2018, San Antonio, TX, October 2018.

Anguiano Virgen, C.; Verbeck, G.F.; Wright, K.C.; Winfield, J.L.; Fox, J.D., *Detection and Analysis of SimulatedWarfare Agents using Portable Mass Spectrometry,* 13th Harsh Environment Mass Spectrometry Workshop, Myrtle Beach, S.C., September 2019, STUDENT AWARD PRESENTATION

Anguiano Virgen, C.; Verbeck. G.F.; *Detection and Analysis of Simulated Chemical Warfare Agents using Portable Mass Spectrometry*, SWAFS 2018, Shreveport, LA, October 2018, INVITED.

Juel, L.A.; De Silva, I.W.; Kiselak, T.D. Verbeck. G.F.; *A More Efficient Means to Paper Spray Mass Spectrometry in Fentanyl Analysis*, SWAFS 2018, Shreveport, LA, October 2018, INVITED.

De Jesus, J.M.; Bunch, J.; Costa, C.; Webb, R.; Verbeck, G.F.; Bailey, M.; *Investigating and Comparing Internal Standard Addition Methods for Direct Analyte Probed Nanoextraction (Dapne)* 66th ASMS Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN, June 2018.

Costa, C.; Bunch, J.; Goodwin, R; Palitsin, V; Webb, R.; Verbeck, G.F.; De Jesus, J.M.; Bailey, M *Mass Spectrometry–Ion Beam Analysis: A New Tool for Molecular and Elemental Speciation?* 66th ASMS Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN, June 2018.

Kretsch, A.; Verbeck, G.F., *: Plasma Pyrolysis Mass Spectrometry for the Diagnosis of Leishmaniasis***,** 65th ASMS Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN, June 2017.

Aguilar, R.; Verbeck, G.F., *Soft-Landed Metallic Nanoparticles for Mass Spectrometry Imaging of Fingermarks***,** 65th ASMS Conference on Mass Spectrometry and Allied Topics, Indianapolis, IN, June 2017.

McBride, E.; Mach, P.; Wright, K.C.; Verbeck, G.F., *Detection and On-Site Presumptive Testing of a Clandestine Drug Laboratory using a Portable Mass Spectrometer***,** 64rd ASMS Conference on Mass Spectrometry and Allied Topics, San Antonio, TX, June 2016.

Aguilar, R.; Verbeck, G.F., *Utilization of Soft-landing Ion Mobility for the Deposition of Clusters as Matrix Substitutes for Matrix-assisted Laser Desorption/Ionization Mass Spectrometry Imaging***,** 64rd ASMS Conference on Mass Spectrometry and Allied Topics, San Antonio, TX, June 2016.

Mach, P.; Wright, K.C.; Verbeck, G.F., *Reverse Gas Stack Model for Localization of Chemical Interests Utilizing Mobile Mass Spectrometry***,** 64rd ASMS Conference on Mass Spectrometry and Allied Topics, San Antonio, TX, June 2016.

Huynh, V.; Sasiene, Z. J.; Mach, P. M.; Golden, T. D.; Verbeck, G. F., "*Direct analyte-probed nanoextraction (DAPNe)-coupled to nanospray ionization mass spectrometry applied to document analysis*",.SciX 2015, Providence, RI, September 2015.

Williams, K.C.; Verbeck, G. F., "*Characterizing and Databasing Drugs and Drug Analogs to Stay Ahead of Clandestine Designer Drug Laboratories*",.SciX 2015, Providence, RI, September 2015.

Hamilton, J.S.; Phelps, M.; Verbeck, G.F., *Single Cell Nanomanipulation to Identify Heterogeneity of Fatty Acid Profiles within Healthy and Diseased Breast Tissue at the Cancer Forefront,* 63rd ASMS Conference on Mass Spectrometry and Allied Topics, St. Louis, MO, June 2015.

Mach, P.; Wright, K.C.; Verbeck, G.F., *Investigation of NIR Diode Wavelength and Material Combinations for Increased Permeability in Portable Membrane Inlet Mass Spectrometry***,** 63rd ASMS Conference on Mass Spectrometry and Allied Topics, St. Louis, MO, June 2015.

Phelps, M.; Verbeck, G.F., *Monitoring Single Cell Lipids: in vitro Tracking of Fatty Acid Uptake via Nanomanipulation-Coupled Mass Spectrometry,* 63rd ASMS Conference on Mass Spectrometry and Allied Topics, St. Louis, MO, June 2015.

Gorishek, E.; Mach, P.; Hamilton, J.S.; Verbeck, G.F., *Phospholipid localization by Cold Cell LA-ICP-MS Imaging of Arabidopsis Thaliana Seeds and Extraction for Analysis by NSI-MS,* 63rd ASMS Conference on Mass Spectrometry and Allied Topics, St. Louis, MO, June 2015.

Hamilton, J.S.; Phelps, M.; Verbeck, G.F., *TiRaNI bioworkstation: Single cell analysis at the cancer forefront***,** Southwest Regional Meeting of American Chemical Society, SWARM 2014, Fort Worth, TX, November 2014.

Phelps, M.; Hamilton, J.S.; Verbeck, G.F., *Single cell nanomanipulation to identify heterogeneity of fatty acid profiles within healthy and diseased breast tissue at the cancer forefront*, Southwest Regional Meeting of American Chemical Society, SWARM 2014, Fort Worth, TX, November 2014.

Mach, P.M.; Wright K.C.; Verbeck, G.F., *Incorporation of NIR diodes for enhanced permeability in portable membrane inlet mass spectrometry analysis of PAHs and BTEX*, Southwest Regional Meeting of American Chemical Society, SWARM 2014, Fort Worth, TX, November 2014.

Huynh, V.; Williams, K.C.; Golden, T.D.; Verbeck, G.F., *Forensic application of nanomanipulation applied to document inks*, Southwest Regional Meeting of American Chemical Society, SWARM 2014, Fort Worth, TX, November 2014.

Williams, K.C.; Kretsch, A.; Verbeck, G.F., *Scheduled drugs and drug analogs: Rapid synthesis of tryptamine analogs and assessment of blood-brain barrier permeability and receptor activity* , Southwest Regional Meeting of American Chemical Society, SWARM 2014, Fort Worth, TX, November 2014.

Clemons, K.; Verbeck, G.F., *Staying ahead of clandestine drug labs*, 41st Meeting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2014, Reno, NV, September 2014

Mach, P.; Wright, K.; Verbeck, G.F., *Development of Multi-Membrane Front End Inlets for Membrane Inlet Mass Spectrometry Analysis of PAHs and BTEX*, 41st Meeting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2014, Reno, NV, September 2014

Hamilton, J.; Phelps, M.; Verbeck, G.F., : *TiRaNI Bioworkstation: Single cell analysis at the cancer forefront*, NCI-CSSI 2014, University of North Texas, Denton, TX September 2014

Hamilton, J.; Phelps, M.; Verbeck, G.F., *Single cell nanomanipulation to identify lipid heterogeneity in mammalian cells at the cancer forefront*, , 62st ASMS Conference on Mass Spectrometry and Allied Topics, Baltimore, MD, June 2014

Walton, B.L.; Sturtevant, D.; Chapman, K.; Verbeck, G.F., *Soft-landing ion mobility metal deposition for MALDI-MS imaging of forensic and biological samples*, , 62st ASMS Conference on Mass Spectrometry and Allied Topics, Baltimore, MD, June 2014

Sturtevant, D.; Phelps, M.; Hamilton, J.; Walton, B.L.; Verbeck, G.F.; Chapman, K., *Characterization of Gossypol Metabolites in situ in Pigmented Glands of Cotton Embryos Using Laser Desorption Ionization (LDI)-and Nanospray Ionization (NSI)-Mass Spectrometry*, American Society of Plant Biologists-Southern Section (ASPB-SS). Lexington, Kentucky, March 2014.

Huynh, V.; Leveille, J.M.; Joshi, U.; Golden, T.D.; Verbeck, G.F., *Nanomanipulation-coupled to nanospray mass spectrometry applied to document and ink analysis*, 247th ACS National Meeting 2014, Dallas, TX March 2014.

Walton, B.L.; Verbeck, G.F., Chapman, K., *Optimization of soft-landing ion mobility deposition of silver nanoparticles for use as MALDI matrix for biological samples*, Southwest Regional Meeting of American Chemical Society, SWARM 2013, Waco, TX, November 2013.

Clemons, K.; Nnaji, C.; Verbeck, G.F., *Development of a single solvent for extraction of trace inorganic and organic explosives*, Southwest Regional Meeting of American Chemical Society, SWARM 2013, Waco, TX, November 2013.

Walton, B.L.; Verbeck, G.F., *Comparison of Soft-Landed Silver Nanoparticles and Traditional Matrices for Small Molecule MALDI-MS,* 40th Meeting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2013, Milwaukee, WI, September 2013.

Robideau, V.; Hamilton, J.; Verbeck, G.F., *Comparison of Trace Metals in Ricochet Bullets to Their Corresponding Cartridges and Ricochet Marks*, , 40th Meeing of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2013, Milwaukee, WI, September 2013.

Hoffmann, W.D.; He, J; Wright, K.C.; Verbeck, G.F., *Development of a Membrane Inlet Mass Spectrometry-Based Strategy for Environmental Monitoring,* 9th Workshop on Harsh-Environment Mass Spectrometry, St. Pete Beach, FL, September 2013

Clemmons, K.; Torabi, S; Mo. H.; Verbeck, G.F., *Nanomanipulation-coupled to Mass Spectrometry for direct Organelle Analysis to explore Lipid Localization chemistry within Single Cells,* 61st ASMS Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, June 2013.

Hoffmann, W.D.; Verbeck, G.F.; Jackson, G., *Development of a Portable Mass Spectrometer for Operation at 1 Torr*, , 61st ASMS Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, June 2013.

Hamilton, J.; Hoffmann, W.D.; Verbeck, G.F., *Optimizing cold cell LA-IcP-MS conditions for the Analysis of elemental Localization and Imaging of Biological Tissues,* 61st ASMS Conference on Mass Spectrometry and Allied Topics, Minneapolis, MN, June 2013.

Adams, D.H.; Roberts, A.P.; Smith, J.D.; Verbeck, G.F., *Linking mercury to health effects with laser ablation: will it work for marine fishes?*, IRLS 2013, Florida 2013.

Clemmons, K.C.; Verbeck, G.F., *Direct Analyte-Probed Nanoextraction coupled to Nanospray Ionization-Mass Spectrometry for Analysis of Illicit Drugs,* 39th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2012, Kansas City, MO, October 2012.

Walton, B.; Verbeck, G.F., *Alternative MALDI Matrix Found in Silver Nanoparticles Produced via Soft-Landing Ion Mobility,* 39th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2012, Kansas City, MO, October 2012.

Fox, J.D.; Hoffmann, W.D.; Verbeck, G.F., *Multi-analysis Platform Incorporating Raman Microscopy and Multiple Internal Reflection-Infrared Spectroscopy for the in situ Analysis of Soft-Landed Clusters,* 39th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2012, Kansas City, MO, October 2012.

Hoffmann, W.D.; He, J.; Verbeck, G.F., *Portable Linear Quadrupole Membrane Inlet Mass Spectrometer for Environmental Monitoring,* 39th Meting of Federation of Analytical Chemistry and Spectroscopy Societies, SciX 2012, Kansas City, MO, October 2012.

Hoffmann W.D.; Verbeck, G.F, *Softlanding Preparative Mass Spectrometry Platform for Directing New Materials and Theoretical Elucidation of Electronic Structure and Properties* Proposers' Conference for the Focus Center Research Program (SRC), Dallas, TX, May, 2012

Hoffmann W.D.; Jones, J.; Perez, J.; Verbeck, G.F., *Hafnium Oxide Deposition on Mechanically Exfoliated SiO2 Supported Graphene by Soft-Landing Ion Mobility,* 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, BC, May 2012.

Clemons, K.; Wiley R.; Fox, J.D.; Verbeck, G.F., *Direct Analyte-Probed Nanoextraction (DAPNe) Coupled to Nanospray Ionization – Mass Spectrometry for Analysis of Illicit Substances*, 60th ASMS Conference on Mass Spectrometry and Allied Topics, Vancouver, BC, May 2012.

Wiley, R.; Verbeck, G.F., *Direct Analyte Probed Nanoextraction (DAPNe)- Coupled to Nanospray Ionization-Mass Spectrometry of Drug Residues from Latent Fingerprints*, University of North Texas Scholars Day, Denton, TX, April 2012.

Horn, P.; Ledbetter, N. Hoffmann, W.D.; Neogi, P.; Korte, A.; James, C.; Case, C.; Shulaev, V; Lee, Y; Verbeck, G.F.; Chapman, K. "*Direct visualization of lipid heterogeneity in plant tissue by direct organelle mass spectrometry and MALDI mass spectrometry*", 67th Southwest Regional Meeting of the American Chemical Society (SWARM 2011), Austin, TX, November 2011. INVITED.

Fox, J.D.; Roberts, A.; Verbeck, G.F. "*Raman Imaging-Coupled to Nanoextraction NSI-MS for Quick Screening and Analysis of Astaxanthin and Caroteno-Protein in Copepods"*, 38th Federation of Analytical Chemistry and Spectroscopy Societies, Reno, NV, October 2011. ORAL

Hoffman, W.D.; Davila, S.J.; Jones, J.; Perez, J.; Verbeck, G.F. "*Investigation of Hf-Doped Graphene by Soft-Landing Ion Mobility"*, 38th Federation of Analytical Chemistry and Spectroscopy Societies, Reno, NV, October 2011. ORAL

Waverka, K.N.; Verbeck, G.F. "*Nanomanipulation-Coupled to Nanospray Mass Spectrometry for Ultra-Trace Forensic Analysis"*, 38th Federation of Analytical Chemistry and Spectroscopy Societies, Reno, NV, October 2011. ORAL

Dziekonski, E.; Hoffmann, W.D.; Verbeck, G.F. *"A Study of How Alternative Buffer Gases can Affect Energetic Materials in an Ion Trap Mass Spectrometers,* 8th Workshop on Harsh-Environment Mass Spectrometry, St. Pete Beach, FL, September 2011.

Hoffmann, W.D.; Davila, S.J,; Verbeck, G.F., "*Generation of Monolayer Protected Clusters on Surfaces by Softlanding of Mass Selected Ions*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Walton, B.L.; Verbeck, G.F., "*Bond Dissociation Energy Determinations of Group-11 (Cu, Ag, Au) Cyanide Complexes Using Electrospray Ionization Mass Spectrometry and Theoretical Calculations*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Davila, S.J; Hoffmann, W.D.; Verbeck, G.F., "*A Novel MALDI Matrix Source Utilizing Softlanding Ion Mobility to Rapidly Deposit Ag Nanoparticles for Use as MALDI Matrices*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Fox, J.D.; Roberts, A.;Verbeck, G.F, "*Nanomanipulation-Nanospray Ionization Mass Spectrometry-Coupled to Raman Microscopy to Elucidate Astaxanthin-Protein Interaction in Freshwater Copepods*", 59th ASMS Conference on Mass Spectrometry and Allied Topics, Denver, CO, June 2011.

Hoffmann, W.D.; Wallace, N.M.; **Verbeck, G.F**., "*Trace Drug Residue Analysis with Microscopy and Microextraction-Coupled to Nanospray Mass Spectrometry from Forensic Lifts*", 37th Annual FACSS Conference, Raleigh, NC, October 2010, Won 1st Place Poster Presentation

Hoffmann, W.D.; Verbeck, G.F., "*Liquid Nitrogen Cooled Stage for Laser Ablation Inductively Coupled Mass Plasma Spectrometry*", 37th Annual FACSS Conference, Raleigh, NC, October 2010

Wallace, N.; Verbeck, G.F., *"THC Extraction from Crystal Rain Using Nanomanipulation-coupled to Nanospray Ionization-Mass Spectrometry",* SWAFS 2010 Annual Meeting and Training Conference, Grapevine, TX, September 2010.

Wallace, N.; Verbeck, G.F., ***"****Ultra Trace Drug Residue Analysis from Fingerprints using Nanomanipulation-Coupled to Nanospray Ionization-Mass Spectrometry",* SWAFS 2010 Annual Meeting and Training Conference, Grapevine, TX, September 2010.

Hart A.; Verbeck, G.F., ***"****Elemental Analysis of Through-and-Through Bullet Holes using Laser Ablation Inductively-Coupled Plasma Mass Spectrometry",* SWAFS 2010 Annual Meeting and Training Conference, Grapevine, TX, September 2010

Davila, S.J.; **Verbeck, G.F**., "Investigation of Silver nanoparticle MALDI matrices deposited at sub-eV kinetic energy using soft landing ion mobility (SLIM)" 19th International Conference on Ion Mobility Spectrometry, Albuquerque, NM, July 2010.

Wallace, N.; Joshi, U.; **Verbeck, G.F.**, "*Forensic Science Applications with Nanomanipulation-Nanospray Ionization: Analysis of Paint, Drugs, and Ink Samples*", ASMS 58th Annual Conference on Mass Spectrometry and Allied Topics, Salt Lake City, UT, May 2010.

Hoffmann, W.D.; Davila, S.J.; **Verbeck, G.F.,** "Soft-Landing of Metal-Carbide Clusters by Rectilinear Ion Trap Mass Spectrometry", 58th ASMS Conference on Mass Spectrometry and Allied Topics, Salt Lake City, UT, May 2010

Davila, S.J.; Hoffmann, W.H., Birdwell, D.O.; **Verbeck, G.F**., "Surface Ion Modification and Characterization of Muscovite by Laser Ablated Carbon and Transition Metal Clusters using Soft Landing Ion Mobility" American Society of Mass Spectrometry 58th Annual Symposium, Salt Lake City, UT, May 2010.

Fox, J.D.; Verbeck, G.F., "*Ruggedized Cylindrical Ion Trap Mass Spectrometer for Field Deployable MS and MS/MS Analysis*", 58th ASMS Conference on Mass Spectrometry and Allied Topics, Salt Lake City, UT, May, 2010.

Hart A.; Wallace, N.; **Verbeck, G.F**., "*Lead and Cadmium Levels in Children's Jewelry using Laser Ablation Inductively Coupled Plasma Mass Spectrometry*", University of North Texas Scholars Day, Denton, TX, April 2010

Joshi, U.; Golden, T.;**Verbeck, G.F**., *"Nanomanipulation-Coupled to Nanospray Mass Spectrometry Applied to Document and Ink Analysis"*, American Academy of Forensic Science 62nd Annual Scientific Meeting, Seattle, WA, February 2010.

Wallace, N.; Hueske, E.; **Verbeck, G.F**., "*Electrostatic Lifting-Coupled with Nanomanipulation-Nanospray Ionization for the Analysis of Illicit Drugs"* American Academy of Forensic Science 62nd Annual Scientific Meeting, Seattle, WA, February 2010.

Davila, S.J.; Birdwell, D.O.; Verbeck, G.F. *"Ion Mobility - Soft-Landing for the Production and Characterization of Metal Clusters"* 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009.

Hoffmann, W.D.; Brown, J.; Petros, R.A.; **Verbeck, G.F**., "*One-Bead, One-Compound Combinatorial Peptide Library Sequencing by Nanomanipulation-Coupled to Nanospray-Mass Spectrometry"*, 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009.

Wallace, N.; Hueske, E.; **Verbeck, G.F**., "*Electrostatic Lifting-Coupled with Nanomanipulation-Nanospray Ionization for the Analysis of Illicit Drugs"*, 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009.

Birdwell, D.O.; Davila, S.J.; Verbeck, G.F., *"Ion Optic Designs for Drift Tube Soft-Landing"*, 65th Southwest Regional Meeting of the American Chemical Society, El Paso, TX, November 2009.

Joshi, U.; Golden, T.;**Verbeck, G.F**., *"Nanomanipulation-Coupled to Nanospray Mass Spectrometry Applied to Document and Ink Analysis"*, Southwestern Association of Forensic Sciences, Orlando, FL, October 2009.

Wallace, N.; Hueske, E.; **Verbeck, G.F.,** "*Electrostatic Lifting-Coupled with Nanomanipulation-Nanospray Ionization for the Analysis of Illicit Drugs"*, Southwestern Association of Forensic Sciences, Orlando, FL, October 2009.

Fox, J.D.; Verbeck, G.F., "*Deployable Remote Miniature Cylindrical Ion Trap Mass Spectrometer"*, 7th Workshop on Harsh-Environment Mass Spectrometry, Santa Barbara, CA, September 2009.

Horn, P.; **Behrendt, A.K.;** Chapman, K.D.; **Verbeck, G.F**.; "*Liquid Microphase Extraction and Controlled Emitter Tip Chemistry-Coupled to Nanospray Mass Spectrometry for Direct Lipid Analysis"*, 57th ASMS Conference on Mass Spectrometry, Philadelphia, PA, June, 2009.

Birdwell, D.O.; Davila, S.J.; Verbeck, G.F., "*Investigation of a Modified Smalley Nozzle for Use as an Ion Source for Preparative Mass Spectrometry"*, 57th ASMS Conference on Mass Spectrometry, Philadelphia, PA, June, 2009

Davila, S.J.; Verbeck, G.F.; "*Characterization and isolation of specifically selected Cu nanoclusters using Drift Tube Soft Landing"*, 57th ASMS Conference on Mass Spectrometry, Philadelphia, PA, June, 2009.

Brown, J., **Hoffmann, W.; Verbeck, G.F.;** Petros, R.A., "*Continuing Search for High Affinity, Peptide-Based Ligands to Target Proteins"*, 237th ACS National Meeting, Salt Lake City, UT, March 2009.

Mitchell, J..; Verbeck, G.F., "*Nanomanipulation and Electrospray Mass Spectrometry Applications in Forensic Trace Evidence Analysis*", University Scholars Day, Denton, TX, April, 2009.

Jesseph, A.; Verbeck, G.F., "*The Miniaturization of Cylindrical Ion Trap Mass Spectrometry Incorporating Microelectrical Mechanical System Technology*", University Scholars Day, Denton, TX, April, 2009.

Horn, P.J.; **Ledbetter, N.D.;** Richardson-Case, C.D.; **Verbeck, G.F**.; Chapman, K.D., *"Nanospray Mass Spectrometry Analysis of Isolated Cottonseed Oil Bodies"*, Gordon Research Conference: Plant Lipids; Structure, Metabolism, and Function, Galveston, TX, 2009.

Davila, P; Ledbetter, N.R.; Ernest, R.M.; **Verbeck, G.F**., "*Direct analysis of trace an analytes and GSR from fibers utilizing nanomanipulation-coupled to mass spectrometry*", SWAFS 2008, Southwestern Association of Forensic Scientist, Little Rock, AR, September, 2008.

Behrendt, A.K.; Ledbetter, N.R.; Verbeck, G.F., "*Microphase extraction using a nanomanipulator-coupled to nanospray mass spectrometry*", 236th ACS National Meeting, Philadelphia, PA, August 2008.

Ledbetter, N.R.; Verbeck, G.F., "*Nanomanipulation Coupled to Nanospray Mass Spectrometry: Applications to Direct Cell Probing and Trace Fiber Analysis*", 18th International Association of Forensic Sciences Triennial Meeting, New Orleans, LA, July 2008.

Ledbetter, N.R.; Verbeck, G.F., "Trace Fiber Analysis using Nanomanipulation Coupled to Nanospray Mass Spectrometry", 56th ASMS Conference on Mass Spectrometry, Denver, CO, June, 2008.

Davila, S.J.; Birdwell, D.O., Verbeck, G.F., "Characterization of Soft-Landed (0.1 – 1.0 eV) Nanoclusters and Fullerenes on Au", 56th ASMS Conference on Mass Spectrometry, Denver, CO, June, 2008

Jesseph, A.V.; Martinez, H.E., Verbeck, G.F., " Current Capabilities and Technology for a Deployable, Remote, Miniture Cylindrical Ion Trap", Fifth Annual University Scholars Day, Denton, TX, April, 2008

Walton, B.L; Ledbetter, N.R.; Verbeck, G.F., "Nanomanipulation-coupled to Nanospray Mass Spectrometry: Applications to Trace Fiber Analysis", 235th ACS National Meeting, New Orleans, LA, April 2008.

Student Thesis:

Nayek, Subhayu, "TOXICOLOGICAL AND BIOCHEMICAL CHANGES INDUCED BY SUB-ACUTE EXPOSURE OF BIOLOGICAL ORGANISMS TO SILVER NANOPARTICLES USING SOFT-LANDING ION MOBILITY INSTRUMENT". Ph.D. Thesis 2020

DeSilva, Imesha W., "APPLICATION OF NOVEL MICROPOROUS POLYOLEFIN SILICA-BASED SUBSTRATE IN PAPER SPRAY MASS SPECTROMETRY (PS-MS)", Ph.D. Thesis, 2020.

Kiselak, Thomas D., "MASS SPECTROMETRY GUIDED DEVELOPMENT OF A CONTROLLED RELEASE NANOTRANSFERSOME TRANSDERMAL DRUG DELIVERY SYSTEM", Ph.D. Thesis, 2020.

Converse, Darren, "PAPER SPRAY-MASS SPECTROMETRY OF ILLICIT DRUGS AND CHEMICAL WARFARE PRECURSORS", M.S. 2019

Kretsch, Amanda R.," DETECTION OF HARMFUL CHEMICALS IN THE AIR USING PORTABLE MEMBRANE INLET MASS SPECTROMETRY", M.S., 2018

Aguilar Ayala, Roberto. "APPLICATIONS OF METALLIC CLUSTERS AND NANOPARTICLES VIA SOFT LANDING ION MOBILITY, FROM REDUCED TO AMBIENT PRESSURES", Ph.D. Thesis, 2018

McBride, Ethan M. "UTILIZING RAPID MASS SPECTROMETRY TECHNIQUES TO PROFILE ILLICIT DRUGS FROM START TO FINISH", Ph.D. Thesis, 2018

Hamilton, Jason S. "DISEASE TISSUE IMAGING AND SINGLE CELL ANALYSIS WITH MASS SPECTROMETRY", Ph.D. Thesis, 2017

Mach, Phillip M. "DESIGN CONSIDERATIONS AND IMPLEMENTATION OF PORTABLE MASS SPECTROMETERS FOR ENVIRONMENTAL APPLICATIONS", Ph.D. Thesis, 2016

Nnaji, Chinyere N. "ANALYSIS OF TRACE AMOUNTS OF ADULTERANTS FOUND IN POWDERS/SUPPLEMENTS UTILIZING DIRECT INJECT, NANOMANIPULATION, AND MASS SPECTROMETRY" M.S. Thesis, 2016.

Gorishek, Emma.L. "LASER ABLATION INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY AND RAMAN SPECTROSCOPY IMAGING OF BIOLOGICAL TISSUES", M.S. Thesis, 2016.

Garibay, Luis K. "THEORETICAL ANALYSIS OF DRUG ANALOGUES AND VOC POLLUTANTS", M.S. Thesis, 2016.

Phelps, Mandy S. "LIPIDOMIC ANALYSIS OF SINGLE CELLS AND ORGANELLES USING NANOMANIPULATION COUPLED TO MASS SPECTROMETRY", Ph.D. Thesis, 2015.

Williams, Kristina C. "DIRECT INJECT MASS SPECTROMETRY FOR ILLICIT CHEMISTRY DETECTION AND CHARACTERIZATION", Ph.D. Thesis, 2015.

Walton, Barbara L. "A STUDY OF SILVER: AN ALTERNATIVE MALDI MATRIX FOR LOW WEIGHT COMPOUNDS AND MASS SPECTROMETRY IMAGING", Ph.D. Thesis, 2014.

Fox, James David. "MINIATURE MASS SPECTROMERTY: THEORY DEVELOPMENT AND APPLICATIONS", Ph.D. Thesis, 2013.

Hoffmann, William D. "STUDY OF NOVEL ION/SURFACE INTERACTIONS USING SOFT-LANDING ION MOBILITY", Ph.D. Thesis, 2012.

Joshi, Ubesha., "CHARACTERIZATION OF IONIC LIQUID AS A CHARGE CARRIER FOR THE DETECTION OF NEUTRAL ORGANOMETALLIC COMPLEXES USING ELECTROSPRAY IONIZATION MASS SPECTROMETRY", MS Thesis, 2012.

Davila, Stephen J., "DESIGN AND DEVELOPMENT OF SOFTLANDING ION MOBILITY: A NOVEL INSTRUEMNT FOR PREPARATIVE MATERIAL DEPOSITION", Ph.D. Thesis, 2011.

Wallace, Nicole M., "FORENSIC SCIENCE APPLICATIONS UTILIZING NANOMANIPULATION-COUPLED TO NANOSPRAY MASS SPECTROMETRY FOR THE ANALYSIS OF ULTRA-TRACE ILLICIT DRUGS", MS Thesis, 2011.

Birdwell, David O., "SOFT LANDING ION MOBILITY MASS SPECTROMETRY: HISTORY, INSTRUMENTATION AND AN AMBIENT PRESSURE APPLICATION, MS Thesis, 2010.

Ledbetter, Nicole R., "APPLICATIONS OF NANOMANIPULATION COUPLED TO NANOSPRAYMASS SPECTROMETRY IN TRACE FIBER ANALYSIS AND CELLULAR LIPID ANALYSIS, MS Thesis, 2008.