

J. Tyler Davidson, Ph.D.  
Assistant Professor and Graduate Program Director  
Department of Forensic Science  
College of Criminal Justice  
Sam Houston State University

## Degrees Earned

**Ph.D. Forensic Science**, West Virginia University, Morgantown, West Virginia, **2020**

- Dissertation: "Structural Characterization of Emerging Synthetic Drugs"

**M.S. Forensic and Investigative Science**, West Virginia University, Morgantown, West Virginia, **2017**

- Thesis: "Analysis of 2,5-Dimethoxy-N-(N-methoxybenzyl)phenethylamines (NBOMe) Isomers Using Traditional and Fast Gas Chromatography-Mass Spectrometry"

**B.S. Chemistry**, Shippensburg University, Shippensburg, Pennsylvania, **2015**

- Concentration: Biochemistry
- Magna Cum Laude

## Peer-Review Publications

### Articles

Jared Estevanes, Alleigh N. Couch, **J. Tyler Davidson**, Geraldine Monjardez. Detection of Explosives Residue via a Novel Subsampling Technique for DART-HRMS Analysis. *Forensic Chemistry*, 39 (2024).

Alleigh Couch, **J. Tyler Davidson**. Development of a novel seized drug screening method utilizing DART-MS and used weigh paper. *Forensic Chemistry*, 39 (2024).

Jared Estevanes, **J. Tyler Davidson**, Geraldine Monjardez. Investigating the Combined Capability of Confocal Raman Microscopy and Direct Analysis in Real Time-Mass Spectrometry (DART-MS) for the Analysis of Intact Explosives. *Forensic Chemistry*, 37 (2024).

Makenzie Kuehn, Kevin Bates, **J. Tyler Davidson**, Geraldine Monjardez. Evaluation of Handheld Raman Spectrometers for the Detection of Intact Explosives. *Forensic Science International*, 353 (2023).

Peng Che, **J. Tyler Davidson**, Jeroen Kool, Isabelle Kohler. Electron activated dissociation – a complementary fragmentation technique to collision-induced dissociation for metabolite identification of synthetic cathinone positional isomers. *Analytica Chimica Acta*, 1283 (2023).

Alexis Pollard, **J. Tyler Davidson**. Investigating the effect of substitution location on fentanyl analog identification for methyl-substituted fentanyl analogs using GC-EI-MS. *Forensic Chemistry*, 36 (2023).

Ruby E. Liliedahl, Elise Hutzell, Madison Haley, Daniel P. Predecki, **J. Tyler Davidson**. The differentiation of *N*-butyl pentylone isomers using GC-EI-MS and NMR. *Forensic Science International*, 351 (2023).

Peng Che, **J. Tyler Davidson**, Kristina Still, Jeroen Kool, Isabelle Kohler. In vitro metabolism of cathinone positional isomers: does sex matter?, *Analytical and Bioanalytical Chemistry*, 415, 5403-5420 (2023).

Samantha A. Mehnert, **J. Tyler Davidson**, Alexandra Adeoye, Brandon D. Lowe, Emily A. Ruiz, Jacob R. King, Glen P. Jackson. Expert Algorithm for Substance Identification Using Mass Spectrometry: Statistical Foundations in Unimolecular Reaction Rate Theory. *Journal of the American Society for Mass Spectrometry*, 34, 7, 1235–1247 (2023).

Glen P. Jackson, Samantha A. Mehnert, **J. Tyler Davidson**, Brandon D. Lowe, Emily A. Ruiz, Jacob R. King. Expert Algorithm for Substance Identification Using Mass Spectrometry: Statistical Foundations in Unimolecular Reaction Rate Theory. *Journal of the American Society for Mass Spectrometry*, 34, 7, 1248–1262 (2023).

Alleigh N. Couch, Jared Sharp, **J. Tyler Davidson**. Assessing the effectiveness of the NIST DART-MS Forensics Database and Data Interpretation Tool for designer drug screening with alternative instrumentation. *International Journal of Mass Spectrometry*, 483 (2022).

Jared Sharp, Daniel Do, **J. Tyler Davidson**. Assessment of the Similarity Between In-Source Collision-Induced Dissociation (IS-CID) Fragment Ion Spectra and Tandem Mass Spectrometry (MS/MS) Product Ion Spectra for Seized Drug Identifications. *Forensic Chemistry*, 30 (2022).

Ruby E. Liliedahl, **J. Tyler Davidson**. The differentiation of synthetic cathinone isomers using GC-EI-MS and multivariate analysis. *Forensic Chemistry*, 26 (2021).

**J. Tyler Davidson**, Zachary Sasiene, Glen Jackson. Comparison of in-source collision-induced dissociation and beam-type collision-induced dissociation of emerging synthetic drugs using a high-resolution quadrupole time-of-flight mass spectrometer. *Journal of Mass Spectrometry*, 56, e4679 (2021).

**J. Tyler Davidson**, Zachary Sasiene, Glen Jackson. Fragmentation pathways of odd- and even-electron *N*-alkylated synthetic cathinones. *International Journal of Mass Spectrometry*, 453 (2020).

**J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, Jack DeRuiter, C. Randall Clark, Glen Jackson. Fragmentation pathways of  $\alpha$ -pyrrolidinophenone synthetic cathinones and their application to the identification of emerging synthetic cathinone derivatives. *International Journal of Mass Spectrometry*, 453 (2020).

**J. Tyler Davidson**, Zachary Sasiene, Glen Jackson. The influence of chemical modifications on the fragmentation behavior of fentanyl and fentanyl-related compounds in electrospray ionization tandem mass spectrometry. *Drug Testing and Analysis*, 12, 957–967 (2020).

**J. Tyler Davidson**, Elettra Piacentino, Zachary Sasiene, Younis Abiedalla, Jack DeRuiter, C. Randall Clark, Giel Berden, Jos Oomens, Victor Ryzhov, Glen Jackson. Identification of novel fragmentation pathways and fragment ion structures in the tandem mass spectra of protonated synthetic cathinones. *Forensic Chemistry*, 19 (2020).

**J. Tyler Davidson**, Zachary Sasiene, Glen Jackson. The characterization of isobaric product ions of fentanyl using multi-stage mass spectrometry, high-resolution mass spectrometry and isotopic labeling. *Drug Testing and Analysis*, 12, 496-503 (2020).

Isaac Willis, Zilin Fan, **J. Tyler Davidson**, Glen Jackson. Weathering of ignitable liquids at elevated temperatures: a thermodynamic model, based on laws of ideal solutions, to predict weathering in structure fires. *Forensic Chemistry*, 18 (2020).

**J. Tyler Davidson**, Glen Jackson. The differentiation of 2,5-dimethoxy-N-(N-methoxybenzyl)phenethylamine (NBOMe) isomers using GC retention indices and multivariate analysis of ion abundances in electron ionization mass spectra. *Forensic Chemistry*, 14 (2019).

**J. Tyler Davidson**, Benny Lum, Gina Nano, Glen Jackson. Comparison of measured and recommended acceptance criteria for the analysis of seized drugs using Gas Chromatography-Mass Spectrometry (GC-MS). *Forensic Chemistry*, 10, 15-26 (2018).

Maíra dos Santos, Emily Gleco, **J. Tyler Davidson**, Glen Jackson, Renata Limberger, Luis Arroyo. DART-MS/MS screening for the determination of 1,3-dimethylamylamine and undeclared stimulants in seized dietary supplements from Brazil. *Forensic Chemistry*, 8, 134-145 (2018).

#### **Peer-Reviewed Presentations/Posters**

Peng Che, Christina Chang, Jeroen Kool, Patrick Buzzini, **J. Tyler Davidson**, Isabelle Kohler. Identification of synthetic cathinone positional isomers using electron-activated dissociation and chemometrics. Proceedings of the Dutch Society for Mass Spectrometry and Belgian Society of Mass Spectrometry. Rolduc, Netherlands, Poster Presentation, April 2024.

**J. Tyler Davidson**, Alleigh N. Couch. Hidden Traces: An Alternative Analytical Scheme for Seized Drug Analysis. Proceedings of the American Academy of Forensic Sciences. Denver, CO, Poster Presentation, February 2024.

Alleigh N. Couch, Jayleigh M. Lanza, Christopher M. Zall, **J. Tyler Davidson**. Ag-Ligand Ion Complexation: An Alternative Approach for Hemp and Marijuana Differentiation. Proceedings of the American Academy of Forensic Sciences. Denver, CO, Poster Presentation, February 2024.

Emma K. Hardwick, **J. Tyler Davidson**. Structural Characterization of Nitazene Analogs Using Electron Ionization-Mass Spectrometry (EI-MS). Proceedings of the American Academy of Forensic Sciences. Denver, CO, Poster Presentation, February 2024.

Christina Chang, Geraldine Monjardez, **J. Tyler Davidson**. Assessment of a Combined Portable Raman Spectroscopy and Mass Spectrometry Approach for the Analysis of Seized Drugs. Proceedings of the American Academy of Forensic Sciences. Denver, CO, Poster Presentation, February 2024.

Jared Estevanes, Alleigh Couch, **J. Tyler Davidson**, Geraldine Monjardez. Investigating the Capability of DART-MS for the Analysis of Intact Explosives and Explosives Residue. Proceedings of the American Academy of Forensic Sciences. Denver, CO, Oral Presentation, February 2024.

John Laetsch III, Jose Grijalva, Ting-Yu Huang, Patrick Buzzini, Jorn Yu, **J. Tyler Davidson**, Geraldine Monjardez. Analysis of Major Cannabinoids using Raman Microscopy, Chemometrics and a Novel Artificial Intelligence Approach. Proceedings of the American Academy of Forensic Sciences. Denver, CO, Poster Presentation, February 2024.

Cailin Herl, Geraldine Monjardez, **J. Tyler Davidson**, James Miller, Alaina Anderson, Mona Colca. Investigating the Degradation of Benzodiazepines. Center for Forensic Science Research and Education (CFSRE) Current Trends in Seized Drug Analysis Symposium. (Virtual), Poster Presentation, January 2024.

Jayleigh M. Lanza, Alleigh N. Couch, **J. Tyler Davidson**, Christopher M. Zall. Differentiation of Cannabinoids Through Selective Binding to Silver and Copper Phosphine Complexes. Proceedings of the American Chemical Society. San Francisco, CA, Poster Presentation, August 2023.

Peng Che, **J. Tyler Davidson**, Jeroen Kool, Isabelle Kohler. Electron Activated Dissociation - A Complementary Fragmentation Technique to Collision Induced Dissociation for Metabolite Identification of Synthetic Cathinones. Proceedings of the Dutch Society for Mass Spectrometry Spring Symposium. Wageningen, Netherlands, Oral Presentation, June 2023.

Alleigh N. Couch, Jayleigh M. Lanza, Christopher M. Zall, **J. Tyler Davidson**. Differentiation of Hemp and Marijuana Using Ag-Ligand Ion Complexation and a Semi-Quantitative Decision-Point Assay. Proceedings of the American Society for Mass Spectrometry. Houston, TX, Poster Presentation, June 2023.

Elise Hutzell, Madison Haley, Daniel Predecki, Ruby E. Liliedahl, **J. Tyler Davidson**. Forensic Analysis and Identification of Pentylones via NMR Spectroscopy. Proceedings of the American Chemical Society. Indianapolis, IN, Poster Presentation, March 2023.

Makenzie Kuehn, **J. Tyler Davidson**, Geraldine Monjardez. An Assessment of Field-Portable Instrumentation for Pre-Blast Explosives Detection. Proceedings of the American Academy of Forensic Sciences. Orlando, FL, Poster Presentation, February 2023.

Alexis Pollard, **J. Tyler Davidson**. Investigating the Effect of Substitution Location on Fentanyl Analog Identification for Methyl-Substituted Fentanyl Analogs Using Gas Chromatography/Electron Ionization/Mass Spectrometry (GC/EI/MS). Proceedings of the American Academy of Forensic Sciences. Orlando, FL, Poster Presentation, February 2023.

Alleigh N. Couch, Jayleigh M. Lanza, Christopher M. Zall, **J. Tyler Davidson**. Differentiation of  $\Delta^9$ -Tetrahydrocannabinol ( $\Delta^9$ -THC) and Cannabidiol (CBD) Using Silver-Ligand Ion Complexation and Electrospray Ionization Tandem Mass Spectrometry (ESI-MS/MS). Proceedings of the American Academy of Forensic Sciences. Orlando, FL, Poster Presentation, February 2023.

**J. Tyler Davidson**, Jared Sharp, Daniel Do. Quantifying the Mass Spectral Similarity Between IS-CID Fragment Ion Spectra and MS/MS Product Ion Spectra for Seized Drug Identifications.

Proceedings of the American Society for Mass Spectrometry. Minneapolis, MN, Poster Presentation, June 2022.

Jared Sharp, **J. Tyler Davidson**. Identifying the Similarity Between In-Source Collision-Induced Dissociation (IS-CID) Fragment Ion Spectra and Tandem Mass Spectrometry (MS/MS) Product Ion Spectra for Seized Drug Identifications. Proceedings of the American Academy of Forensic Sciences. Seattle, WA, Poster Presentation, February 2022.

**J. Tyler Davidson**. Mass Spectrometry Fragmentation for NPS Identification. Center for Forensic Science Research and Education (CFSRE) Current Trends in Seized Drug Analysis Symposium. (Virtual), Invited Presentation, January 2022.

Glen P. Jackson, Samantha Mehnert, **J. Tyler Davidson**. EASI: A New Paradigm for Mass Spectral Identifications. SciX Conference. Providence, RI, Oral Presentation, September 2021.

Ruby E. Liliedahl, **J. Tyler Davidson**. Synthetic Cathinone Isomer Differentiation Using GC-EI-MS and Multivariate Analysis. Forensic Technology Center of Excellence (FTCoE) National Forensic Science Week. (Virtual), Poster Presentation, September 2021.

**J. Tyler Davidson**. The Influence of Chemical Modifications on the Fragmentation of Fentanyl Analogs. American Society of Crime Laboratory Directors (ASCLD) Forensic Research Committee (FRC) Lightning Talks, Episode 9: Novel Fentanyl Analysis Research. (Virtual), Invited Presentation, July 2021.

Ruby E. Liliedahl, **J. Tyler Davidson**. The Differentiation of Synthetic Cathinone Isomers by Gas Chromatography/Electron Ionization/Mass Spectrometry (GC/EI/MS) and Multivariate Analysis. Proceedings of the American Academy of Forensic Sciences. Houston, TX (Virtual), Poster Presentation, February 2021.

Alia Hacker, **J. Tyler Davidson**, Glen P. Jackson. The Effect of Modifications to the Core Fentanyl Structure on the Observed Product Ion Spectra. Proceedings of the American Academy of Forensic Sciences. Houston, TX (Virtual), Oral Presentation, February 2021.

Alex Adeoye, Samantha Mehnert, **J. Tyler Davidson**, Glen P. Jackson. The Development of a Multivariate Mass Spectral Algorithm for the Identification of Seized Drugs. Proceedings of the American Academy of Forensic Sciences. Houston, TX (Virtual), Oral Presentation, February 2021.

**J. Tyler Davidson**, Zachary Sasiene, Glen Jackson. Tandem Mass Spectrometric Fragmentation Behavior of Fentanyl and Fentanyl-Related Compounds. Presented at the First WVU Online Forensic Graduate Symposium. Morgantown, WV, Oral Presentation, May 2020.

Glen Jackson, **J. Tyler Davidson**, Zachary Sasiene, Brandon Lowe, Younis Abiedalla, C. Randall Clark, Elettra Piacentino, Victor Ryzhov. Towards an Improved Understanding of the Mass Spectrometric Identification of Cathinones and Fentalogs. Proceeding of the Pittsburgh

Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON). Chicago, IL, Oral Presentation, March 2020.

Caitlyn Wensel, Isaac Willis, **J. Tyler Davidson**, Natasha Eklund, Amanda Setser, Victoria McGuffin, Ruth Smith, Glen Jackson. Thermodynamic and Kinetic Predictions of the Evaporation Patterns of Ignitable Liquids at Elevated Temperatures. Proceeding of the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON). Chicago, IL, Oral Presentation, March 2020.

**J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark, Jack DeRuiter, Glen Jackson. On the Fragmentation Behavior of Fentanyl and Its Analogs in Electrospray Ionization-Tandem Mass Spectrometry (ESI-MS/MS). Proceedings of the American Academy of Forensic Sciences. Anaheim, CA, Oral Presentation, February 2020.

Samantha Mehnert, Brandon Lowe, Emily Ruiz, **J. Tyler Davidson**, Glen Jackson. A Regression-Based Algorithm to Maximize the Confidence in Mass Spectral Identifications. Proceedings of the American Academy of Forensic Sciences. Anaheim, CA, Oral Presentation, February 2020.

Caitlyn Wensel, Isaac Willis, Zilin Fan, **J. Tyler Davidson**, Glen Jackson. The Effects of Elevated Temperature and Substrates on the Weathering of Ignitable Liquids. Proceedings of the American Academy of Forensic Sciences. Anaheim, CA, Oral Presentation, February 2020.

Glen Jackson, Samantha Mehnert, Brandon Lowe, Emily Ruiz, **J. Tyler Davidson**. A Regression-Based Algorithm to Maximize the Confidence in Mass Spectral Identifications. Proceedings of the Eastern Analytical Symposium. Plainsboro, NJ, Oral Presentation, November 2019.

Samantha Mehnert, Brandon Lowe, Emily Ruiz, **J. Tyler Davidson**. Development of a Flexible Algorithm for Substance Identification Using Mass Spectrometry. Proceedings of the Eastern Analytical Symposium. Plainsboro, NJ, Poster Presentation, November 2019.

Glen Jackson, Samantha Mehnert, Brandon Lowe, **J. Tyler Davidson**. A Regression-based Algorithm to Maximize the Confidence in Mass Spectral Identifications. Proceedings of the Federation of Analytical Chemistry and Spectroscopy Societies (SciX). Palm Springs, CA, Oral Presentation, October 2019.

Glen Jackson, **J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, Jack DeRuiter, C. Randall Clark. On the Mass Spectral Interpretation of Cathinones and Fentanyl Analogs. Proceedings of the Federation of Analytical Chemistry and Spectroscopy Societies (SciX). Palm Springs, CA, Oral Presentation, October 2019.

**J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark, Glen Jackson. Fragmentation Pathways of  $\alpha$ -Pyrrolidinophenone Derivative Synthetic Cathinones. Proceedings of the American Society for Mass Spectrometry. Atlanta, GA, Poster Presentation, June 2019.

Glen Jackson, **J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark. On the Tandem Mass Spectrometry of Cathinones and Mass Spectrometric Identification of Drugs. Proceedings of the American Chemical Society. Orlando, FL, Oral Presentation, March 2019.

Glen Jackson, Samantha Mehnert, Brandon Lowe, **J. Tyler Davidson**. On the Tandem Mass Spectrometry of Cathinones and Mass Spectrometric Identification of Drugs. Proceedings of the American Chemical Society. Orlando, FL, Poster Presentation, March 2019.

Glen Jackson, Samantha Mehnert, Brandon Lowe, **J. Tyler Davidson**. Development of a Flexible Algorithm for Substance Identification Using Mass Spectrometry. Proceeding of the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON). Philadelphia, PA, Poster Presentation, March 2019.

Isaac Willis, Zilin Fan, **J. Tyler Davidson**, Glen Jackson. The Influence of Elevated Temperatures on the Weathering of Ignitable Liquids. Proceeding of the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (PITTCON). Philadelphia, PA, Poster Presentation, March 2019.

**J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark, Glen Jackson. The Identification of a Novel Fragmentation Pathway of Synthetic Cathinones. Proceedings of the American Academy of Forensic Sciences. Baltimore, MD, Oral Presentation, February 2019.

Samantha Mehnert, Brandon Lowe, **J. Tyler Davidson**, Glen Jackson. The Development of a Flexible Algorithm for Substance Identification Using Mass Spectrometry. Proceedings of the American Academy of Forensic Sciences. Baltimore, MD, Oral Presentation, February 2019.

Sarah Chaffman, Tyler Williams, James Miller, **J. Tyler Davidson**, Glen Jackson. Identification of an Ultraviolet (UV)-Induced Promethazine Dimer. Proceedings of the American Academy of Forensic Sciences. Baltimore, MD, Poster Presentation, February 2019.

Glen Jackson, **J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark. On the Mass Spectrometric Identification of Synthetic Cathinones. Proceedings of the Australia and New Zealand Forensic Science Society (ANZFSS). Perth, Australia, Oral Presentation, September 2018.

Samantha Mehnert, Brandon Lowe, **J. Tyler Davidson**, Glen Jackson. Development of a Flexible Algorithm for Substance Identification Using Mass Spectrometry. Presented at the West Virginia University Summer Undergraduate Research Symposium. Morgantown, West Virginia, Poster Presentation, July 2018.

Brandon Lowe, Samantha Mehnert, **J. Tyler Davidson**, Glen Jackson. Development of a More Selective Mass Spectral Identification Algorithm. Presented at the West Virginia University Summer Undergraduate Research Symposium. Morgantown, West Virginia, Poster Presentation, July 2018.

Glen Jackson, **J. Tyler Davidson**. MS Comparator: Ultra-Precise Spectral Comparisons. Presented at the Forensic and Homeland Security Workshop of the 66<sup>th</sup> ASMS Conference on Mass Spectrometry and Allied Topics. San Diego, CA, Oral Presentation, June 2018.

**J. Tyler Davidson**, Zachary Sasiene, Younis Abiedalla, C. Randall Clark, Glen Jackson. Identification of a Novel Fragmentation Pathway of Synthetic Cathinones. Proceedings of the American Society of Mass Spectrometry. San Diego, CA, Poster Presentation, June 2018.

Heloá Santos, **J. Tyler Davidson**, Joseph Cox, Glen Jackson, Wanderson Romão, Luis Arroyo. Potential Applications to New Psychoactive Substances Identification in Oral Fluid and Damiana Leaf (*Turnera Diffusa*) by DART-MS/MS and LC-MS/MS. Proceedings of the American Society of Mass Spectrometry. San Diego, CA, Poster Presentation, June 2018.

**J. Tyler Davidson**, Benny Lum, Gina Nano, Glen Jackson. Quantifying the Uncertainty of Measurement of Gas Chromatography-Mass Spectrometry (GC/MS) Acceptance Criteria. Proceedings of the American Academy of Forensic Sciences. Seattle, WA, Poster Presentation, February 2018.

**J. Tyler Davidson**, Glen Jackson. The Analysis of 2,5-Dimethoxy-N-(N-methoxy-benzyl)phenethylamine (NBOMe) Isomers Using Traditional and Fast Gas Chromatography/Mass Spectrometry (GC/MS). Proceedings of the American Academy of Forensic Sciences. New Orleans, LA, Poster Presentation, February 2017.

**Jay Davidson**, Daniel Predecki, John Richardson. Qualitative and Quantitative Analysis of Fluorine Containing Synthetic Cannabinoids. Proceedings of the American Chemical Society. Denver, CO, Poster Presentation, March 2015.

### Research Monographs and Technical Reports

José Almirall, **J. Tyler Davidson**, Adam Hall, Linda Jackson, Ira Lurie, Amber McConnell, Jeannette Perr, Frances Scott, Edward Sisco. Forensic Laboratory Needs – Technology Working Group (FLN-TWG) Evolving Approaches and Technologies for Seized Drug Analysis. Forensic Technology Center of Excellence, RTI International. 2023.

Ira Lurie, **J. Tyler Davidson**. Ultra-High Performance Liquid Chromatography Photo Diode Array Ultraviolet Single Quadrupole Mass Spectrometry (UHPLC-PDA UV-MS). Forensic Technology Center of Excellence. RTI International. 2023.

**J. Tyler Davidson**, Ira Lurie. Gas Chromatography-Vacuum Ultraviolet Spectroscopy (GC-VUV). NIJ Forensic Technology Center of Excellence. RTI International. 2023.

**J. Tyler Davidson**, Edward Sisco, Amber McConnell, Adam Hall. Direct Analysis in Real Time Mass Spectrometry (DART-MS). Forensic Technology Center of Excellence. RTI International. 2023.

## Funded External Grants

Assessing the Uncertainty of GC-MS Chromatographic Peak Area. Center for Advanced Research in Forensic Science (CARFS), National Science Foundation (NSF). \$25,000. Principal Investigator: **J. Tyler Davidson**. Period: 01/01/2024-12/31/2024.

Differentiation of CBD and  $\Delta^9$ -THC Isomers Using Copper Ion Complexation and Electrospray Ionization Tandem Mass Spectrometry. Forensic Sciences Foundation Lucas Grant Program. \$5,400. Faculty Advisor: **J. Tyler Davidson**. Period: 10/01/2023-09/30/2024.

Structural Characterization of Nitazene Analogs by Mass Spectrometric Methods. National Institute of Standards and Technology (NIST), United States Department of Commerce (DoC), Measurement Science and Engineering (MSE) Research Grant. Award No. 60NANB23D092. \$55,000. Principal Investigator: **J. Tyler Davidson**. Period: 07/01/2023-06/30/2025.

## Work or Professional Experiences

### Assistant Professor, Forensic Science (fall 2020-present)

College of Criminal Justice, Sam Houston State University, Huntsville, TX

- Research focused on forensic applications of mass spectrometry
- Graduate Courses:
  - Forensic Science 6094/6319: Controlled Substance Analysis (fall 2021, spring 2023, spring 2024)
  - Forensic Science 6094/5117: Controlled Substances (fall 2021, fall 2022, fall 2023)
  - Forensic Science 5445: Forensic Instrumental Analysis (fall 2021, fall 2022, fall 2023)
  - Forensic Science 7094/7345: Advanced Mass Spectrometry (fall 2020, spring 2022, spring 2023)
- Undergraduate Courses:
  - SHSU Online Faculty Certification for Online Instruction
  - Forensic Science 4380: Ethics and Professional Practice (spring 2021)
  - Honors Course Credit for FORS 3366 (fall 2020 and spring 2021)
  - Forensic Science 3366: Introduction to Forensic Science (fall 2020-summer 2021, summer 2022, summer 2023)
    - Completed Honors Contracts (fall 2020 and spring 2021)

### Graduate Research Assistant, Forensic Science (fall 2018-spring 2020)

Jackson Group, Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV

- Structural Characterization of Emerging Synthetic Drugs (NIJ Award #:2018-75-CX-0033)
- Multi-Stage mass spectrometry ( $MS^n$ ), high-resolution mass spectrometry (HRMS), isotopic labeling, fragmentation mechanisms
- Synthetic cathinones and fentanyl-related compounds (FRCs)

### Forensic Science Summer Camp Mentor/Instructor (2016-2019)

- Forensic Chemistry (summer 2019)
  - Taught basics of forensic chemistry and led laboratory exercises
- Forensic DNA (summer 2017)
  - Taught students about the discipline of forensic DNA and led laboratory exercises

### **Graduate Teaching Assistant (fall 2015-spring 2018)**

Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV

- Forensic and Investigative Science 614: Introduction to Trace Analysis (spring 2018)
- Forensic and Investigative Science 660: Forensic Chemistry (fall 2017 and fall 2018)
- Chemistry 116 (spring 2017)
- Chemistry 115 (spring and fall 2016)
- Chemistry 110 Learning Center (spring 2016)
- Chemistry 112 (spring 2016)
- Chemistry 111 (fall 2015 and spring 2017)

### **Honors and Awards**

- Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Innovation Award for co-authored work entitled EASI: A New Paradigm for Mass Spectral Identifications (2021)
- American Academy of Forensic Sciences Emerging Forensic Scientists Award (2020)
- WVU Foundation Distinguished Doctoral Scholarship (spring 2020)
- WVU Eberly College Outstanding Graduate Teaching Assistant (2018-2019)
- Blaney Graduate Fellowship WVU FIS Department (2016-2019)
- Society of Analytical Chemists of Pittsburgh Award Shippensburg University (2014-2015)
- Association of Pennsylvania State College & University Faculties (APSCUF) Chemistry Student of the Year Award Shippensburg University (2012-2013)
- Board of Governors Scholarship Shippensburg University (2011-2015)

### **Professional Memberships and Other Competencies**

Professional

- Preparation and delivery of a workshop titled “Evolving Approaches and Technologies to Address Existing Challenges in Seized Drug Analysis” (4 Hours, 1 Day) at the American Academy of Forensic Sciences (AAFS) conference in Denver, CO (spring 2024)
- Preparation and delivery of a workshop titled “Electron Ionization Mass Spectral Interpretation” (8 Hours, 1 Day) at the Southwestern Association of Forensic Scientists (SWAFS) Conference (fall 2023)
- Editorial Board Member for *Forensic Chemistry* (fall 2023-present)
- Chair of the American Society for Mass Spectrometry (ASMS) Forensics and Homeland Security Interest Group (2024), Co-Chair (2023)
- American Academy of Forensic Sciences (AAFS) – Associate Member (2023-present)
- Preparation and delivery of a workshop titled “Mass Spectral Interpretation” (8 Hours, 2 Days) at the Midwestern Association of Forensic Scientists (MAFS) Conference (fall 2022)
- Moderator for the “Great Chemistry!” session at the 15th Annual Sam Houston State University Undergraduate Research Symposium (spring 2022)
- Moderator for the “Drugs I” session at the 74th Annual American Academy of Forensic Sciences Meeting, Seattle, Washington (spring 2022)
- Completed the Forensic Science Education Programs Accreditation Commission (FEPAC) Site Evaluator Training through the American Academy of Forensic Sciences (spring 2022)
- Forensic Laboratory Needs Technology Working Group (FLN-TWG) Novel Approaches and Technologies to Challenges in Seized Drug Analysis Subcommittee - Auxiliary Member (November 2021-November 2022), Chair (December 2022-2023)

- Development and delivery of Training Modules for the Forensic Explosion Dynamics and Complex Fatality Scene Investigations Training for the Pasadena Fire Marshal's Office (fall 2021-fall 2023)
- Development and delivery of Training Modules for the Texas Department of Public Safety through the Institute for Forensic Research, Training, and Innovation (IFRTI) (spring 2021-spring 2023)
- Scientific Programming Committee for First WVU Online Forensic Graduate Symposium (spring 2020)
- American Society for Mass Spectrometry (ASMS) (2018-present)
- Ad hoc reviewer for *Forensic Chemistry*, *Journal of the American Society for Mass Spectrometry*, and *Analytical Chemistry* (2017-present)
- American Chemical Society (ACS) – Student Member (2015-2020)

#### Sam Houston State University

- Department of Forensic Science Assistant to the Chair Search Committee (spring 2024)
- Department of Forensic Science Lab Manager Search Committee (Chair, spring 2024)
- University Parking Appeals Committee – Regular Member (Fall 2023-Present)
- Department of Forensic Science Graduate Program Director (Summer 2023-present)
- Department of Forensic Science Tenure-Track Faculty Search Committee (spring and summer 2023)
- Department of Forensic Science Postdoctoral Fellow Search Committee (fall 2022)
- University Institutional Review Board Committee – Alternate Member (fall 2021-present)
- University Student Disciplinary Hearing (fall 2021-present)
- College of Criminal Justice Scholarship Committee (fall 2020-spring 2023)
- Department of Forensic Science Graduate Standards and Admissions Committee (fall 2020-present)
- Department of Forensic Science Curriculum Committee (fall 2020-present)
- Department of Forensic Science Safety Committee (fall 2020-spring 2021)
- Department of Forensic Science Safety Officer (fall 2020-summer 2023)