

KRISTINA C. WILLIAMS

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EDUCATION

University of North Texas

Ph.D. in Analytical Chemistry

May 2016

Advisor: Dr. Guido Verbeck

Thesis: Direct Inject Mass Spectrometry for
Illicit Chemistry Detection and Characterization

Tennessee Technological University

B.Sc. Chemistry

Dec. 2010

EMPLOYMENT

University of North Texas Department of Chemistry, Denton, TX

Continuing Senior Lecturer: September 2022 - present

Continuing Lecturer: August 2018 – August 2022

Courses

- CHEM 3330 – Forensic Science Analysis
 - Overview of the field of criminalistics, with a focus on the recognition, collection, preservation and analysis of physical evidence. Introduction to topics such as fingerprint examination, trace evidence analysis and firearm examination with hands-on lab exercises
- CHEM 4360 – Principles of Forensic Science
 - This course will introduce forensic topics in a continuation of CHEM 3330. It is designed to reinforce knowledge of forensic techniques and skills critical to evidence preservation and collection, culminating in processing of a mock crime scene. It will also provide students with an understanding of professional ethics in forensic science and courtroom techniques.
- CHEM 4351 – Forensic Chemistry
 - This course surveys various topics in forensic chemistry such as drug analysis, toxicology, arson, ink/paint, and related instrumentation. An emphasis is placed on hands-on lab exercises and maintaining a detailed, professional looking lab notebook.
- CHEM 3451/3452 – Quantitative Analysis and Lab
 - This course introduces students to the theory and practice of the quantitative aspects of the basic analytical chemistry such as solution preparation, statistical analysis, equilibrium calculations, titration analysis, electrochemistry, spectrophotometry, and introductory instrumental analysis.
- CHEM 4900/CHEM 4912/BIOL 4900 – Forensic Internship
 - Students in the UNT Forensic Science Program are required to complete a capstone experience for their degree. This includes a research project (hands-on or literature review) or an internship in an offsite laboratory. This course will also review topics necessary for future success in the

forensic field such as professional development, ethics, basic statistics, QA/QC, Documentation, and Document Control.

Faculty Advisor – Forensic Science Program: August 2018 - present

- Advise students in the Forensic Science Program each semester
- Coordinate internships for students in the Forensic Science Program
- Recruit new students via participation at Preview Days, Mean Green Merit, COS tours, and other similar events

Departmental Service

- **Chair** – Ad Hoc Committee on Career Readiness: August 2021 - present
 - Investigate and develop opportunities to improve undergraduate career readiness through additional training programs or workshops
 - Develop courses in our new program, FLIGHT: Facilitated Learning of Instrumentation - Guided Hands-on Training
 - Micro-credential courses that combine self-paced remote learning and assessments with in-person training and hands-on access to analytical instrumentation
 - Students receive an electronic badge to append to LinkedIn profiles or resumes upon completion of a project portfolio
 - First course for Gas Chromatography-Mass Spectrometry launched in Spring 2021
- **Mentor** – Capstone Research Paper (in lieu of internship): January 2020 – present
 - 7 students
 - Guide significant (~4000-6000 word) independent research papers that serve as a capstone thesis in lieu of the internship required of Forensic Science students
 - Topics are typically chosen by the students and may be over any forensic discipline of their choice
 - Meet regularly to discuss topic, direction, progress, proofread, assist with literature search skills, and technical formatting skills
- **Member** – Department of Chemistry Analytical Division: January 2020 – present
 - Write and administer candidacy exam each year
 - Attend oral proposal defenses for candidacy in the Analytical Division
 - Serve on two PhD committees
- **Member** - Chemistry Undergraduate Affairs Committee: January 2019 – present
 - Assist with decisions on undergraduate curriculum, departmental scholarship awards, and recruiting
- **Mentor** – Honors Contracts: January 2019 – present
 - 4 students
 - Guide small (2100 word) independent research papers for students in the Honors College to receive Honors credits for my class
 - Topics are chosen by the students and are an expansion of material already presented in the syllabus
 - Meet regularly to discuss topic, direction, progress, proofread, assist with literature search skills, and technical formatting skills

College/University Service

- **President** – North Texas AWIS: April 2019 - present
- **Faculty Advisor** – Forensic Science Club: August 2019 - present
- **Faculty Advisor** – Honors College STEM Interest Community: November 2019 – March 2020
 - Plan and implement STEM-themed educational and/or social events for Honors College students
- **Guest Speaker**
 - COS Proton Panel: Faculty Edition
 - Student ACS Chapter
 - Forensic Science Club

Community Service

- **Member** – Advisory Board for Criminal Investigation and Forensic Science at the Technology, Education & Career Center West (Lewisville ISD): April 2021 – present
- **Guest Speaker** – Northwest ISD Women in STEM Career Day: February 2020

AIT Laboratories, A HealthTrackRx Company, Denton, TX

Certifying Scientist (PRN): December 2020 – January 2021

- Analyzed and reported RT-PCR results for COVID-19 testing

Principal Clinical Scientist: July 2017 – September 2018

- Developed and validated sample clean-up methods for urine, blood, and oral fluid for compliance drug monitoring
- Developed and validated compliance drug monitoring assays on LCMS
- Monitored and updated lab processes and protocols in accordance with College of American Pathologists (CAP) and CLIA regulations
- Communicated with clients regarding testing and patient results
- Contributed to departmental strategic development with the lab leadership team
- Trained employees on process updates
- Administered monthly continuing education for lab employees
- Led a laboratory leadership training program for lab supervisors

Laboratory Manager: Jan. 2016 – July 2017

- Oversaw daily laboratory operations
- Performed daily QC/calibration on laboratory instrumentation
- Helped maintain all LCMS instrumentation in the lab
- Maintained appropriate staffing, scheduling, and training for the lab
- Monitored and maintained lab processes and protocols in accordance with CAP and CLIA regulations
- Tracked employee and instrumentation metrics
- Monitored laboratory consumable inventory
- Prepared for and participated in inspections performed by regulatory authorities

University of North Texas, Denton, TX

Research Assistant: Dr. Guido Verbeck Research Group, Nov. 2011 – Dec. 2015

- Managed multiple research projects
 - Trace detection and analysis of illicit drugs within latent fingerprints
 - Trace detection and analysis of explosives and post-blast material
 - Toxicological screening of illicit drugs using a parallel artificial membrane permeability assay and cell membrane stationary phase solid phase extraction
- Performed maintenance and troubleshooting for LC-MS, GC-MS, and direct infusion ESI-MS instrumentation as needed
- Prepared manuscripts for publication of research
- Edited manuscripts for lab members
- Performed quarterly laboratory safety inspections
- Prepared and presented posters and oral presentations at multiple conferences
- Prepared grant proposals for NIJ and assisted with grant proposals for NIH
- Prepared grant reports for NIJ and DoD
- Assisted undergraduate students with research projects leading to publications
- Trained undergraduate and graduate students on instrumentation

Tutor/Mentor: Chemistry Resource Center, July 2015 – Aug. 2015

- Tutored/mentored undergraduate students in all areas of chemistry

Teaching Assistant: Forensic Chemistry, CHEM 4351, Jan. 2013 – May 2013

- Designed, prepared, and supervised experiments for senior level forensic chemistry
- Trained students on necessary instrumentation including HPLC, LCMS, GCMS, UV/Vis

Teaching Assistant: General Chemistry for Science Majors, Sept. 2011 – Dec. 2011, June 2015 – July 2015, August 2015 – December 2015

- Supervised general chemistry laboratory
- Taught students general chemistry topics relevant to the experiments conducted

Tennessee Tech University, Cookeville, TN

Teaching Assistant: Organic Chemistry I & II, June 2010 – Dec. 2010

- Prepared and supervised experiments
- Taught students organic chemistry topics relevant to the experiments conducted

SKILLS

- Experienced using and maintaining quadrupole ion trap and triple quadrupole mass spectrometers
- Experienced using and maintaining ESI and EI ionization sources for mass spectrometry
- Experienced using and maintaining gas chromatography and liquid chromatography instrumentation
- Well-versed in chromatography and mass spectrometry software from several manufacturers including Waters, Thermo Scientific, AB Sciex, and Agilent

- Experienced performing Raman Spectroscopy imaging
- Experienced using stereo microscopes and inverted microscopes

PUBLICATIONS*

Huynh, V.; **Williams, K.C.**; Golden, T.G.; Verbeck, G.F. “Investigation of falsified documents via direct analyte probe nanoextraction coupled to nanospray mass spectrometry, fluorescence microscopy, and Raman spectroscopy”, *Analyst*, (2015) DOI: 10.1039/c5an01026h.

Nnaji, C.N.; **Williams, K.C.**; Bishop, J.M.; Verbeck, G.F. “Hydrogen as a GC/MS carrier and buffer gas for use in forensic laboratories”, *Science and Justice*, (2015) 55:3 162-167.

Clemons, K.; Kretsch, A.; Verbeck, G.F. “Parallel Artificial Membrane Permeability Assay for Blood-Brain Permeability Determination of Illicit Drugs and Synthetic Analogues”, *Science and Justice*, (2014) 54:5 351-355.

Clemons, K.; Nnaji, C.; Verbeck, G.F. “Overcoming Selectivity and Sensitivity Issues of Direct Inject Electrospray Mass Spectrometry via DAPNE-NSI-MS”, *Journal of the American Society for Mass Spectrometry*, (2014) 25 705-711.

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”, *Forensic Science International*, (2013) 231 98–101.

Clemons, K.; Wiley, R.; Fox, J.; Dziekonski, E.; Verbeck, G.F. “Direct Analyte Probed Nanoextraction (DAPNe) - Coupled to Nanospray Ionization-Mass Spectrometry of Drug Residues from Latent Fingerprints”, *Journal of Forensic Science*, (2013) 58:4 875-880.

PRESENTATIONS†

Williams, K. Incorporating soft-skill discussions and professional development into forensic science education. 2020 Biennial Conference on Chemical Education. Abstract accepted March 31, 2020. Because of the global COVID-19 pandemic, the 2020 Biennial Conference on Chemical Education was terminated on April 2, 2020, by the Executive Committee of the Division of Chemical Education, American Chemical Society; and, therefore, this presentation could not be given as intended.

Williams, K.; Verbeck, G.F. “Characterizing and databasing drugs and drug analogs to stay ahead of clandestine designer drug laboratories”, *SciX 2015: 42nd Annual Meeting of FACSS*, Providence, RI, October 2015. – **ORAL PRESENTATION**

Williams, K.; Kretsch, A.; Verbeck, G.F. “Blood-Brain Barrier Permeability Assay and Cell Membrane Chromatography – Mass Spectrometry for Investigating and Databasing Drug Analogs”, 27th ASMS Sanibel Conference on Mass Spectrometry Security and Forensic Applications, Clearwater Beach, FL, January 2015.

* Published and presented as Kristina Clemons prior to July 2014.

† Published and presented as Kristina Clemons prior to July 2014.

Williams, K.; 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 the American Chemical Society, Fort Worth, TX, November 2014.

Clemons, K.; Kretsch, A.; Verbeck, G.F. “Characterizing and databasing designer drugs to stay ahead of clandestine labs”, SciX 2014: 41st Annual Meeting of FACSS, Reno, NV, October 2014. – **ORAL PRESENTATION**

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

Clemons, 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. – **ORAL PRESENTATION**

Clemons, K.; Wiley, R.; Nnaji, C.; Verbeck, G.F. “Direct Analyte-Probed Nanoextraction-coupled Nanospray Ionization – Mass Spectrometry for Analysis of Illicit Substances”, SciX 2012: 39th Annual Meeting of FACSS, Kansas City, MO, October 2012.

Clemons, K.; Wiley, R.; Fox, J.; Dziekonski, E.; 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.

HONORS AND AWARDS

James J. and Ruth I. Spurlock Scholarship Award	2015
Outstanding Research Achievement by a Graduate Student in Chemistry Department of Chemistry, University of North Texas, Denton, TX	
Best Poster Presentation	2015
27 th ASMS Sanibel Conference on Mass Spectrometry Security and Forensic Applications, Clearwater Beach, FL	
ASMS Travel Award	2015
27 th ASMS Sanibel Conference on Mass Spectrometry Security and Forensic Applications, Clearwater Beach, FL	
Raupe Travel Grant	2014
University of North Texas, Denton, TX	
Toulouse Graduate School Travel Grant	2013, 2014
University of North Texas, Denton, TX	
College of Arts and Sciences Travel Grant	2012, 2015
University of North Texas, Denton, TX	
Graduate Assistantship Tuition Scholarship	2012, 2014

University of North Texas, Denton, TX
Earl McDonald Leadership Scholarship
Tennessee Technological University, Cookeville, TN

2007

AFFILIATIONS

American Academy of Forensic Science
Association for Women in Science
American Society for Mass Spectrometry
Society for Applied Spectroscopy
Alpha Chi Sigma Chemistry Fraternity, BH Chapter