

Carl Edward Wolf II, PhD, MS, F-ABFT



Toxicology Supervisor
Assistant Professor of Pathology
Department of Pathology
Virginia Commonwealth University
Office: 804-828-4420
Carl.Wolf@vcuhealth.org

Licenses & Certifications

- 2014 - Present **Fellow**, American Board of Forensic Toxicology, Inc. Colorado Springs, Colorado. Recertified in 2018
- 2001 - 2012 **Forensic Toxicology Specialist**, American Board of Forensic Toxicology, Inc. Colorado Springs, Colorado. Recertified 2006 & 2011
- 2012 - 2014 **Diplomate**, American Board of Forensic Toxicology, Inc. Colorado Springs, Colorado

Education

- 2000 - 2005 **Doctorate of Philosophy**, Forensic Toxicology, Department of Pathology, Medical College of Virginia at VCU, Richmond, Virginia.
- 1993 - 1994 **Master of Science**, Forensic Science Option, Department of Administration of Justice, Virginia Commonwealth University, Richmond, Virginia
- 1988 - 1993 **Special Student**, Medical College of Virginia & Virginia Commonwealth University, Richmond, Virginia
1998 - 2000
- 1986 **Bachelor of Science**, Chemistry, Gannon University, Erie, PA

Grants and Awards

- 2022 "The problems with Cannabinoid Analogs (Delta-8 THC, Delta-10 THC and CBD) and their metabolites detectability in urine drug testing for potential cannabinoid abuse." Principle Investigator (PI), National Institute of Justice, Research and Development in Forensic Science for Criminal Justice Purposes, 15PNIJ-21-GG-04188-RESS.
- 2019 "Evaluating Matrix Effects of Beverages on Tetrahydrocannabinol and Cannabidiol Measurement Using Liquid Chromatography-Mass Spectrometry". Mentor, VCU Undergraduate Research Opportunities Program (UROP), UROP Summer Research Fellowship, Virginia Commonwealth University.
- 2018 "Development of Matrix Matched Quality Control Materials and Sample Preparation Techniques for the Analysis of Marijuana Infused Products and their Application to Edible Testing", Principle Investigator (PI), National Institute of Justice, Research and Development in Forensic Science for Criminal Justice Purposes, 2017-R2-CX-0029. Closed October 31, 2020.
- 2017 "Evaluation of sample preparation techniques for Matrix Effects and Absolute Recovery using UPLC-MS/MS using opiates and liver tissue specimens as the model and application to post-mortem toxicology." Co-PI, National Institute of Justice, Research and Development in Forensic Science for Criminal Justice Purposes, 2016-DN-BX-0148. Closed May 31, 2018.
- 2017 "True Prevalence of Heroin Use in Patients from a Pain Management Clinic." Mentor, VCU Undergraduate Research Opportunities Program (UROP), UROP Summer Research Fellowship, Virginia Commonwealth University.
- 2007 School of Medicine Teaching Excellence Award; The Educational Innovation/Educational Research Award, Virginia Commonwealth University School of Medicine, Richmond, Virginia. Chronic Non-Malignant Pain Management Curriculum.
- 1983 Chemical Rubber Company Press' Outstanding Freshman Chemist, Gannon University.

Professional Experience

- 1991 - Present **Toxicology Laboratory Supervisor**, Hospital Toxicology & Toxicology Specialty Testing Laboratories, Medical College of Virginia Hospitals and Physicians at VCUHS, Richmond, Virginia.
- Responsible for overseeing QA/QC, instrument maintenance and repair, method development and validation, and keeping documentation for CAP, CLIA, OSHA and TJC accreditation or compliance.
 - Participate in writing specifications and evaluate new instruments to purchase.
 - Supervise blood drug testing for Virginia DUI & DUID testing as an accredited independent laboratory.
 - Supervise urine testing for College of American Pathologists (CAP) FDT.
 - Certifying Scientist for forensic testing performed in the laboratory.
 - Testify and consult formally and informally on procedures and methods used in the laboratory for analyzing samples for various drugs.
 - Educate housestaff on appropriate testing and interpretation of testing to determine the most effective testing for patient care.

2015 - Present **Lecturer**, Ambulatory Clinic Rotation for Primary Care Interns, Department of Internal Medicine, School of Medicine, Virginia Commonwealth University, Richmond, Virginia. Responsible for educating interns on the theory, utility and interpretation of drug testing and how it is involved in patient care.

2005 - Present **Forensic Toxicologist**, Reviewing records and providing expert testimony in the Commonwealth of Virginia and the State of North Carolina relating to Human Performance Toxicology, Forensic Workplace Drug Testing, and Death Investigation Toxicology (Postmortem Toxicology).

- 2005 - Present **Lecturer**, Virginia Commonwealth University, Richmond Virginia. Provide guest lecturing for graduate students in Forensic Toxicology class in techniques used in the analysis of biological specimens to detect the presence of drugs.
- 2004 - Present **Mentor**, Virginia Commonwealth University, Richmond Virginia. Provide laboratory training and oversight to undergraduate and graduate students, performing internships and independent study from the Forensic Science Program, in the techniques used in the analysis of biological specimens to detect the presence of drugs.
- 2000 - Present **Inspector**, College of American Pathologists, Northfield, IL. Clinical Toxicology and FDT.

Professional Organizations

Society of Forensic Toxicologists (SOFT), Full Member

The International Association of Forensic Toxicologists (TIAFT), Full Member

Appointments

- 2020 **Committee Member**, Guideline C38-A: Control of Preanalytical Variation in Trace Element Determination. Clinical and Laboratory Standards Institute, Inc. (CLSI), Wayne, Pennsylvania
- 2018 - 2019 **Faculty Advisor**, Hubert H. Humphrey Fellowship Program at Virginia Commonwealth University, the U.S. Department of State and the Institute of International Education, Washington, DC.
- 2018 - Present **Vice-Chairholder**, Guideline C40: Measurement Procedures for the Determination of Lead Concentrations in Blood and Urine, Reaffirmation,

Clinical and Laboratory Standards Institute, Inc. (CLSI),
Wayne, Pennsylvania.

- 2018 - Present **Member**, Expert Panel on Clinical Chemistry and Toxicology, Clinical and Laboratory Standards Institute, Inc. (CLSI), Wayne, Pennsylvania.
- 2017 - Present **Assistant Professor**, Adjunct, Department of Pathology, School of Medicine, Medical College of Virginia Campus, Virginia Commonwealth University, Richmond, Virginia.
- 2017 - Present **Graduate Faculty, Affiliate**, School of Medicine, Virginia Commonwealth University, Richmond, Virginia.
- 2017 - Present **Committee Member**, Continuing Education Committee & Annual Meeting's Food and Beverage Committee, Society of Forensic Toxicologists.
- 2013 - Present **Committee Member**, Hospital Pain Committee, VCU Health, Richmond, Virginia. Responsible for providing Toxicology input and resources for the multidisciplinary committee.
- 2008 - Present **Assistant Clinical Professor**, Department of Pathology, School of Medicine, Medical College of Virginia Campus, Virginia Commonwealth University, Richmond, Virginia.
- 2007 - Present **Research Assistant Professor**, Department of Forensic Science, Virginia Commonwealth University, Richmond, Virginia.
- 2004 - Present **Committee Member**, Chronic Non-Malignant Pain Management Curriculum, Department of Internal Medicine, Virginia Commonwealth University Medical Center, Richmond, Virginia. Responsible for providing Toxicology input and resources for the development and updating of a Continuing Education Program for Residents, Interns, and House Staff in the Department of Internal Medicine.

Publications

Singh K, Alagarraju MR, **Wolf CE**, Poklis JL, Kulkarni N, Tharpe W, Joshi PH. Ivabradine toxicity: a case report. *Journal of Medical Case Reports*. 16:393, 2022. <https://doi.org/10.1186/s13256-022-03554-w>.

Provost RG, Downs JW, **Wolf CE**, Williams GR. The high cost of low quality: recurring hypoglycemia in a 63-year-old man. *Clin Chem*. 67(11): 1450-1454. 2021. <https://doi.org/10.1093/clinchem/hvab174>

Downs J, **Wolf CE**, Williams G, Cumpston KL, Kershner E, Wills BK, Negligible nux vomica: homeopathic nux vomica remedies don't contain strychnine? *Toxicon*, <https://doi.org/10.1016/j.toxicon.2021.06.014>

Gesseck AM, Poklis JL, **Wolf CE**, Xu J, Bashir A, Hendricks-Muñoz KD, Peace MR. A Case Study Evaluating the Efficacy of an Ad Hoc Hospital Collection Device for Fentanyl in Infant Oral Fluid. *J Anal Toxicol*, 4 (7): 741–746, 2020, <https://doi.org/10.1093/jat/bkaa069>

Wolf CE, Pierce KL, Dempsey SK, Nanco CR, Poklis JL, Korzun WJ. Using papaverine and its metabolites, 6-desmethyl papaverine (6-DMP) and 4, 6-didesmethyl papaverine (4, 6-DDMP) as biomarkers to improve the detection time of heroin use *J Anal. Toxicol*, [10.1093/jat/bkz069](https://doi.org/10.1093/jat/bkz069).

Ramnarine RS, Poklis JL, **Wolf CE**. Determination of Cannabinoids in Breast Milk using QuEChERS and Ultra-Performance Liquid Chromatography and Tandem Mass Spectrometry (UPLC-MS/MS). *J Anal. Toxicol*. [10.1093/jat/bkz072](https://doi.org/10.1093/jat/bkz072).

Nanco CR, Poklis JL, Hiler MM, Breland AB, Eissenberg TE, **Wolf CE**. An ultra-high-pressure liquid chromatographic tandem mass spectrometry method for the analysis of benzoyl ester derivatized glycols and glycerol. *J Anal. Toxicol*. [10.1093/jat/bkz0](https://doi.org/10.1093/jat/bkz0).

Downs J, Rose R, **Wolf C**, Cumpston K, Wills B. Pediatric guanfacine toxicity with severely elevated plasma level. North American Congress of Clinical Toxicology Annual Meeting, Nashville, TN. September 2019. *Clinical Toxicology*, 2019;57(10):1001.

Poklis JL, Gonek MM, **Wolf CE**, Akbaral HI, Dewey WL. Analysis of carbenoxolone by ultra-high-performance liquid chromatography tandem

mass spectrometry in mouse brain and blood after systemic administration. *Biomedical Chromatography*, 2018, doi: 10.1002/bmc.4465.

Poklis JL, Peace MR, **Wolf CE**. Ethanol Concentration in 56 Refillable Electronic Cigarettes Liquid Formulations Determined by Headspace Gas Chromatography with Flame Ionization Detector (HS-GC-FID). *Drug Testing and Analysis*. 2017, Vol 9(10), pp. 1637-40.

Dempsey SK., Poklis JL, Sweat K, Cumpston K, **Wolf CE**. Acute toxicity from intravenous use of the tricyclic antidepressant tianeptine. *J. Anal Toxicol*. 2017, doi: 10.1093/jat/bkx034.

Rauenzahn S; Sima A; Cassel B; Noreika, D; Gomez T; Ryan L; **Wolf C**; Legakis L; Del Fabbro E. Urine Drug Screen Findings among Ambulatory Oncology Patients in a Supportive Care Clinic. *Supportive Care in Cancer*. 2017, Vol.25(6), pp.1859-64.

Poklis JL, Mulder HA, Halquist MS, **Wolf CE**, Poklis A, Peace MR. The Blue Lotus Flower (*Nymphaea Caerulea*) Resin Used in a New Type of Electronic Cigarette, the Rebuildable Dripping Atomizer. *J Psychoactive Drugs*. <http://dx.doi.org/10.1080/02791072.2017.1290304>.

Peace MR, Krakowiak RI, **Wolf C**, Poklis A, Poklis JL: Identified of MDMB-FUBINACA in Commercially Available E-liquid Formulations Sold for Use in Electronic Cigarettes, *Foren Sci Int*. 271:92-7, 2017.

Poklis JL; **Wolf CE**; Poklis A. 4-Fluoroamphetamine in Serum and Urine from an Intoxicated Patient with Life-Threatening Hyperpyrexia, *J Anal Tox*, 40(2):171-172, 2016.

Wolf CE, Poklis JL, Poklis A. Stability of Tetrahydrocannabinol and Cannabidiol in Prepared Quality Control Medible Brownies, *J Anal Toxicol*, 18 October 2016, 10.1093/jat/bkw114.

Wolf CE, Poklis JL, Cumpston K, Moss M, Poklis A. Acute Dilated Cardiomyopathy and Myocardial Injury after Combined 4-Fluoroamphetamine and Modafinil Ingestion. *Drug Testing and Analysis*, 40(2), 171-172, 2016.

Hieger MA, Emswiler MP, Maskell KF, Sentz JT, Miller KB, **Wolf CE**, Cumpston KL, Wills BK. A Case Series of Clenbuterol Toxicity caused by Adulterated Heroin. *J Emerg Med* 51(3), 259-261, 2016.

Abstracts/Presentations

Wolf CE, Holt AK, Karin KN, Pokhai AA, Poklis JL, Williams GR, Peace MR. The potential to detect 13 cannabinoid acetate analogs in urine using 6 commercially available cannabinoid homogeneous screening kits. SOFT Meeting, Cleveland, OH, November 2022.

Pokhai AA, Poklis JL, Williams GR, **Wolf CE**. "Diet-Weed's" (Δ^8 -THC) cross-reactivity with six commercial cannabinoid urine screening kits. SOFT Meeting, Cleveland, OH, November 2022.

Nanco CR, Poklis JL, Williams GR, **Wolf CE**. Prevalence of cannabinoids (delta-8 & delta-9 THC and CBD) in urine from a pain management compliance testing laboratory. SOFT Meeting, Cleveland, OH, November 2022.

Akala MA, **Wolf CE**, Williams GR. Potential detection of 58 fentanyl analogs in urine using fentanyl immunoassays, SOFT Meeting, Cleveland, OH, November 2022.

Karin KN, Holt AK, Smith ER, Orłowicz S, Taylor AM, Prengaman L, **Wolf CE**, Williams GR, Peace MR, Poklis JL. Separation and quantitation of natural and unnatural THC isomers and analogues by high-performance liquid chromatography tandem mass spectrometry (HPLC-MS/MS). SOFT Meeting, Cleveland, OH, November 2022.

Akala MA, **Wolf CE**, Williams GR. A-295. Potential Detection of 58 Fentanyl Analogs in Urine using Fentanyl Immunoassays, AACCC Meeting, Chicago, IL, July 2022.

Wolf CE, Toxicology Testing, Update, Fall Enforcement Training, Virginia Department of Health Professions, October 27, 2021.

Wolf CE, Budmark AD, Gullerian ML, Quraishi MM, Egbulem CI, Poklis JL, Williams GR, Korzun WJ, Development of a UPLC-MS/MS method for the identification of 52 Fentanyl analogs and 7 isotopically labelled internal standards, SOFT Meeting, Nashville, TN, September 2021.

Nanco CR, Poklis JL, Williams GR, **Wolf CE**, Determination of Cannabinoids in Meconium, SOFT Meeting, Nashville, TN, September 2021.

Karin KN, Poklis JL, Johns SE, Moeller FG, **Wolf CE**, Modification and Validation of EMIT Oxycodone Urine Screening Kits for use with Serum, SOFT Meeting, Nashville, TN, September 2021.

Wolf CE, Puff the Magic Dragon, What's in the Cloud, Department of Pathology, Virginia Commonwealth University. April 2021.

Williams GR, **Wolf CE**, Dooley P, Bachmann LE. Strontium Interference in Clinical Calcium Assays. American Association of Clinical Chemist (AACC) Annual Scientific Meeting & Clinical Lab Expo, December 2020.

Downs J, Rose R, **Wolf C**, Cumpston K, Wills B. Negligible NuxVomica: Do homeopathic remedies contain any strychnine? North American Congress of Clinical Toxicology Annual Meeting, Virtual. September 2020.

Tobarran N, Downs J; **Wolf C**; Wills B; Cumpston K. Pressure Necrosis from Kratom Overdose Requiring Fasciotomy, North American Congress of Clinical Toxicology Annual Meeting, Virtual. September 2020.

Williams GR, Downs JW, **Wolf CE**, Cumpston K, Wills B. Hypercalcemia and Pseudohypercalcemia from Strontium Supplementation. North American Congress of Clinical Toxicology Annual Meeting, Virtual. September 2020.

Wolf CE, Downs JW, Williams GR, Cumpston KL, Wills BK. Potential presence of strychnine and brucine in homeopathic medications. SOFTember, Society of Forensic Toxicology Virtual Meeting, September 2020.

Brightman HL, Poklis JL, Korzun WJ, **Wolf CE**. Evaluation of multiple methods for the analysis of cannabinoid infused beverages. SOFTember, Society of Forensic Toxicology Virtual Meeting, September 2020.

Nanco CR, Gesseck AM, Poklis JL, Xu J, Bashir A, Hendricks-Muñoz KD, Peace MR, **Wolf CE**. Got Tramadol. Method for the Determination of Tramadol and its Metabolites in Breast Milk. SOFTember, Society of Forensic Toxicology Virtual Meeting, September 2020.

Poklis JL, Gholap V, Smith ME, Peace MR, **Wolf CE**, Williams GR, Halquist MS. Identification of Apomorphine and Nuciferine in an Herbal E-liquid, Extracted Resin and Electronic Cigarette Aerosols. SOFTember, Society of Forensic

Toxicology Virtual Meeting, September 2020.

Poklis J, Gholap V, **Wolf CE**, Peace MR, Halquist MS. Blue Lotus flower (*Nymphaea caerulea*) in an electronic cigarette. Society for Research on Nicotine and Tobacco, 26th Annual Meeting, New Orleans, LA, March 2020.

Wolf CE. Just Science Podcast: Just Analyzing Beverages for Cannabinoids. Forensic Technology, Center of Excellence, February 2020, <https://forensiccoe.org/2020-nij-rd-e3/>.

Wolf CE, Brightman HL, Poklis JL, Korzun WJ. Forty plus ways not to analyze beverages for cannabinoids, National Institute of Justice, Forensic Science Research and Development Symposium, American Academy of Forensic Sciences' 72th Annual Scientific Meeting, Anaheim, CA, February 2020.

Poklis JL, Schultz J, Stauffenberg MR, **Wolf CE**. The Detection and Quantification of Tianeptine in Postmortem Blood and Urine, American Academy of Forensic Sciences' 72th Annual Scientific Meeting, Anaheim, CA, February 2020.

Wolf CE, Joshi PH, Singh K, Muthukumar A, Poklis JL. Ivabradine, a non-fatal cardiotoxant overdose and its presence in an unexplained case. SOFT Meeting, San Antonio, TX, October 2019.

Orton KL, Spencer CM, Vest (Heneks) JA, Fielden RB, Poklis JL, **Wolf CE**. Havoc in the Kitchen: Making to do some Baking, the Preparation of Matrix-Matched Cannabinoid Calibrators and Controls SOFT Meeting, San Antonio, TX, October 2019.

Nanco CR, Tenney RD, **Wolf CE**, Banks ML, Poklis JL. Serum plasma fentanyl concentrations increased in rhesus monkeys after fentanyl-TT conjugate vaccine administration. SOFT Meeting, San Antonio, TX, October 2019.

Dempsey SK, **Wolf CE**, Poklis JL. Separation of opiates and their oxime derivatives using differential ion mobility tandem mass spectrometry (DMS-MS/MS). SOFT Meeting, San Antonio, TX, October 2019.

Poklis JL, Revenge M, **Wolf CE**, Gonzalez-Maeso J. Ultra-high-performance liquid chromatograph tandem mass spectrometer (UHPLC-MS/MS) method for the analysis of DOI in mouse blood and brain with corresponding head-twitch

response (HTR)SOFT Meeting, San Antonio, TX, October 2019.

Wolf, CE. Pain Management Compliance Testing – A Brief Synopsis, OMG, What does this mean? VCU Health Office of Continuing Education, Norfolk, Virginia, September 2019.

Downs J, Rose R, **Wolf C**, Cumpston K, Wills B. Pediatric Guanfacine Toxicity with Severely Elevated Plasma Level. North American Congress of Clinical Toxicology Annual Meeting, Nashville, TN. September, 2019.

Wolf, CE. The Highs & Lows of Marijuana Infused Edible (Medible) Testing: Whole New Matrices. Virginia Department of Forensic Science, Richmond, Virginia, July 2019.

Ramnarine RS, Poklis JL, **Wolf CE.** Evaluation of Extraction Methods for the Determination of Cannabinoids in Breast Milk. 2019 NIDA International Forum, San Antonio, Texas. June 2019.

Wolf, CE. Marijuana infused edible (medible) testing: "Chewzing" your technique. 2019 Triangle Chromatography Spring Symposium. Durham, North Carolina. May 2019.

Wolf CE. Heroin: Tip toeing through the poppy fields with opium, Department of Pathology, Virginia Commonwealth University. April 2019.

Wolf CE. Webinar, Development of matrix matched quality control materials and sample preparation techniques for the analysis of marijuana infused products. Emerging Research in Toxicology & Drugs. Center for Forensic Sciences, Forensic Technology Center of Excellence. RTI International, April 2019.

Wolf CE. There's more to heroin than just heroin. Richmond Society for Clinical Laboratory Sciences. Richmond, VA, April 2019.

Wolf CE, Pierce KL, Dempsey SK, Nanco CR, Poklis JL, Korzun WJ. Ultra-performance liquid chromatography tandem mass spectrometry (UPLC-MS/MS) used for the separation of papaverine metabolites, a potential biomarker for latent illicit heroin use. PittCon Conference and Expo 50, Philadelphia, PA, March 2019.

Dempsey SK, **Wolf CE**, Poklis JL. Differential Ion Mobility Tandem Mass Spectrometry (DMS-MS/MS) Used for the Separation of Common Opiates. PittCon Conference and Expo 50, Philadelphia, PA, March 2019.

Hiler M, Ratliff L, Crabtree M, **Wolf CE**, Poklis JL, Nanco CR, Breland A, Eissenberg T. Can Urine Propylene Glycol and/or Vegetable Glycerin Concentration be used as a Biomarker of Recent Electronic Cigarette Use? Society for Research on Nicotine and Tobacco, 25th Annual Meeting, San Francisco, CA, February 2019.

Continuing Education

September 2019 Conference: 2019 Back to the Future: Moving Beyond Opioids for Chronic Pain Conference, VCU Health Continuing Medical Education. Norfolk, VA.

November 2016 Workshop: Interprofessional Education on Opioid Prescribing, VCU School of Medicine. Richmond, VA.

October 2016 Workshop: Medico-Legal Aspects of Medical Marijuana, Society of Forensic Toxicologists Meeting. Dallas, TX.