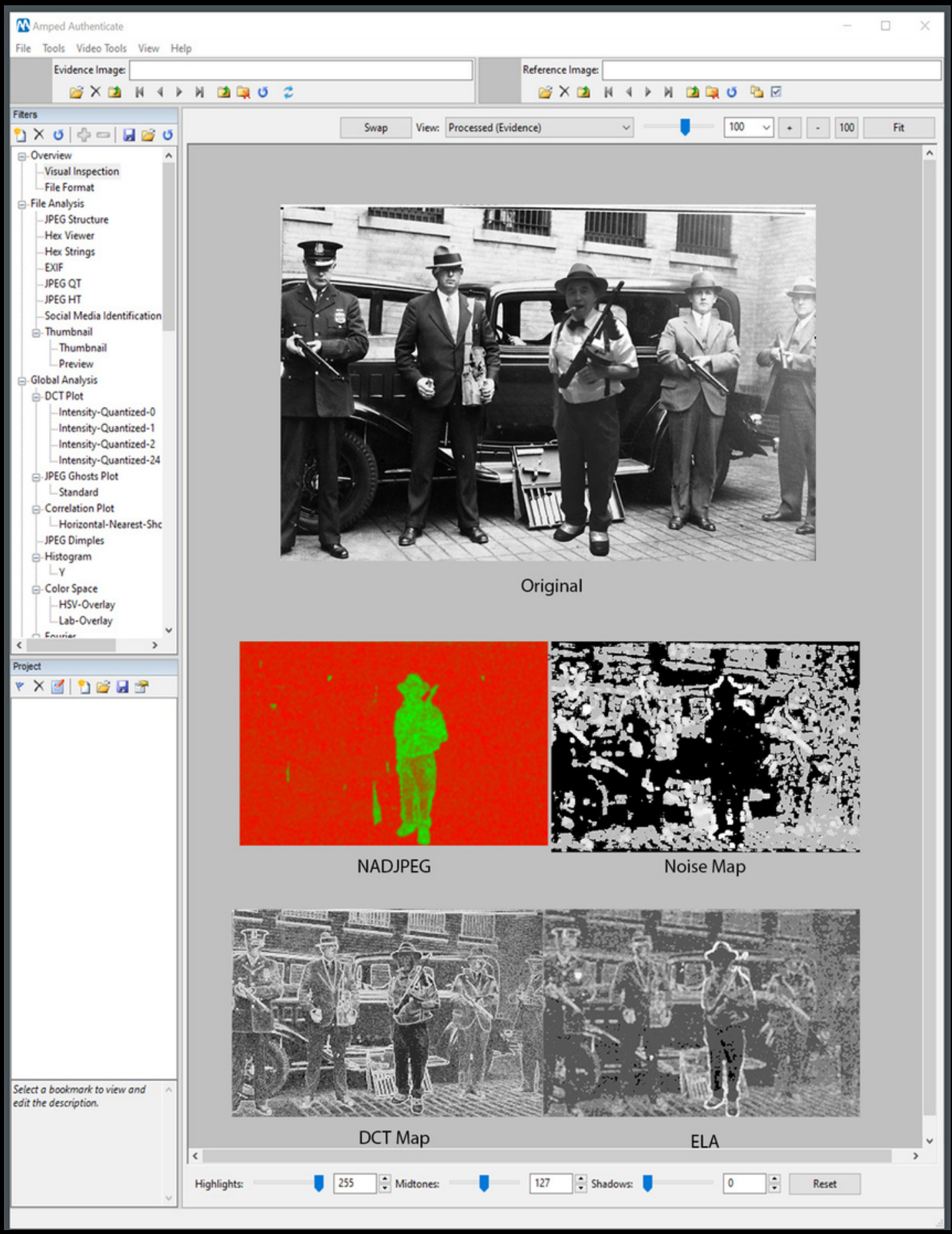
NEAFS Newsletter

Volume 45, Issue 4 Winter 2020



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Forensic Scientist II, 2009-present
BS Genetics, Texas A&M University
BS in Forensic Science, University of New Haven

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Nassau County Office of the Medical Examiner, Division of Forensic Services
Forensic Scientist in the Controlled Substance Analysis Section since 2008
BS in Forensic Science - Long Island University/CW Post
MS in Biology - Long Island University/CW Post

Alanna Laureano- Director
Westchester County Department of Labs & Research, Division of Forensic Sciences Since 2007
Forensic Science Specialist and Assistant DNA Technical Leader
BS in Molecular Biology and Biochemistry- University at Albany, SUNY
MS in Forensic Biology- University at Albany, SUNY

Matthew Marino - Director
New Jersey State Police Office of Forensic Sciences, East Regional Laboratory from November 2011 to present
Forensic Scientist 2 in the Drug Unit and Criminalistics Unit
Westchester County, NY Forensic Laboratory from July 2007 to September 2011
Forensic Technician
BS in Natural Sciences with a concentration in Chemistry-St. Thomas Aquinas College

Northeastern Association of Forensic Scientists

A Message from President Maria Tsocanos

Happy New Year 2021! I would like to begin by congratulating Program Chair Angela Vialotti and the 2020 planning team for organizing a seamless virtual annual meeting. I am proud to say that it was a successful annual meeting given the challenging circumstances.

In case you were unable to attend the virtual meeting, there were some impressive presentations by students and practitioners. We also were able to have a very informative afternoon talk with Investigator Paul Holes about the Golden State Killer case.

On the last day of the meeting we were able to honor Dr. Donald Hoffman with the NEAFS Meritorious Award. He will truly be missed at NEAFS.

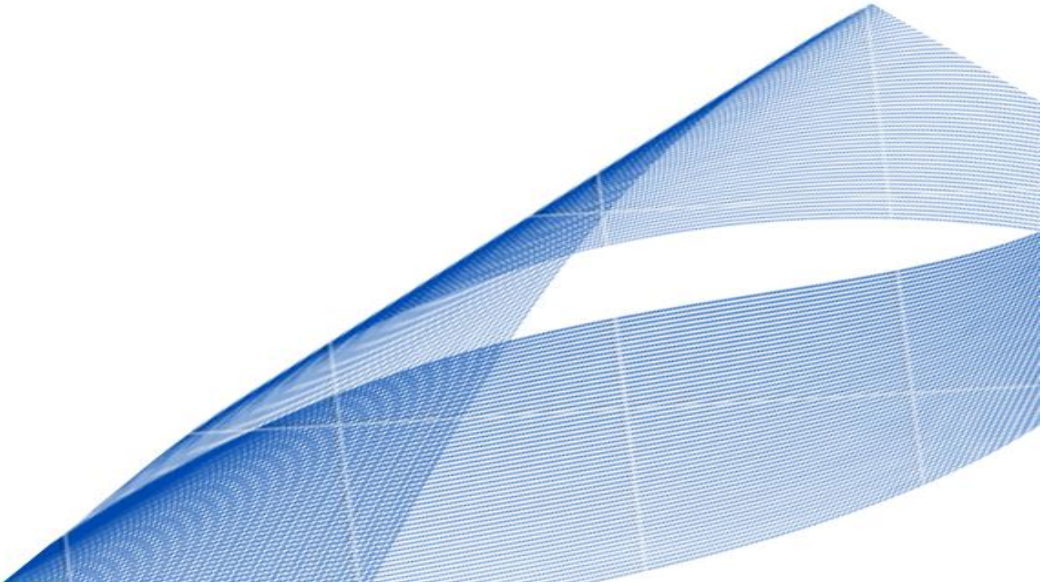
We are hoping that we can see you all in person at the 2021 Annual Meeting in Newport, RI on November 1st – 5th Stay tuned for more information on our website and newsletters.

As I closeout my tenure as President and look back at the past 10 years of my involvement in this organization, it has truly been a humbled and amazing experience. I am honored to have worked side by side with some amazing individuals in this small community of Forensic Scientists. I would like to thank the Board of Directors and Staff for assisting me through this unprecedented but successful year. I would also like to thank the membership for allowing me to serve as your 2020 President.

As the New Year begins I am looking forward to remaining involved with the organization. I am excited to what the future holds for NEAFS.

Stay Safe, Healthy and Positive.

Maria Tsocanos
2020 NEAFS President



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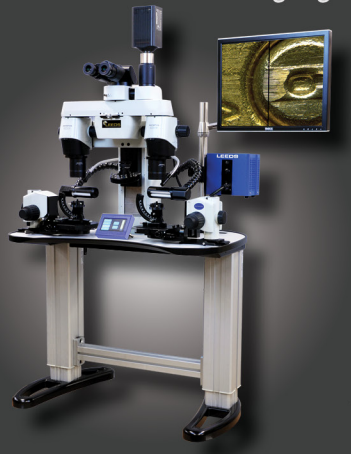

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Northeastern Association of Forensic Scientists

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2021 NEAFS Board of Directors and Staff

The Nominating Committee recommended the following slate of officers to the Board of Directors and an announcement was made to the Membership at the Annual Business Meeting on October 17, 2020. No additional nominations were received. The terms of office are January 1 through December 31.

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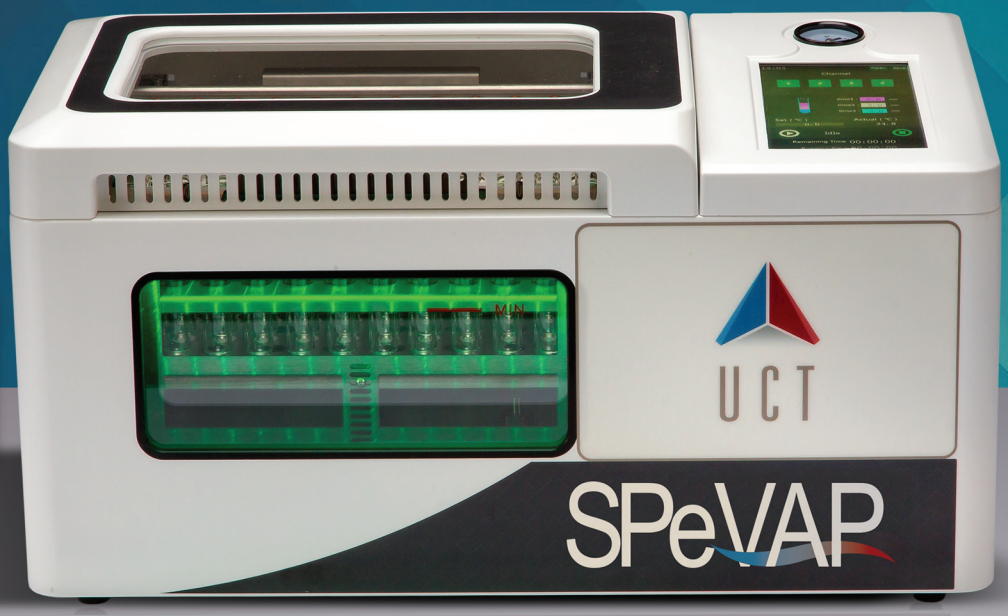

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Meritorious Award
Donald Hoffman, Ph.D., ABFT.

It is with great sadness that I must report the passing of Dr Donald Hoffman. He checked himself into the hospital in mid-March with flu-like symptoms, and lost his battle with COVID-19 a short time later.

I was privileged to call Don my friend, as we worked together for many years at John Jay College of Criminal Justice. We must have had hundreds of meals together, both in the faculty dining room, and more frequently after work at local restaurants around the neighborhood. We also rode together to and from the NEAFS Annual Meetings every year from 2004 to 2019. Don enjoyed every NEAFS meeting, and frequently signed up for the toxicology-related workshops immediately preceding the Annual Meetings.

Dr Hoffman was an accomplished chemist and toxicologist, having received his BA degree in chemistry from New York University and his Ph.D. degree in chemistry from Columbia University. He worked at the New York City Office of Chief Medical Examiner (OCME) as a forensic toxicologist for 27 years, and continued in forensic toxicology as a private consultant right until the virus took him from us. Don was passionate about the field, and often answered calls from attorneys as we were dining. I was always amazed at how detailed and technical his answers were, with zero preparation or advance knowledge of whom was calling or what they were calling about.

Dr Hoffman began teaching forensic toxicology and pharmacology at John Jay College 44 years ago, impacting over 3,000 students in his career there. During that time, he also mentored many students on their research projects, and in 2006 was recognized for his contributions by the Forensic Science Society with an award “In

Recognition of Outstanding and Dedicated Support to the Society and the John Jay Community". To further honor his dedication and contributions, his family is establishing *The Donald B. Hoffman Memorial Scholarship in Toxicology* to benefit students at John Jay College who have chosen the toxicology specialization.

In addition to co-authoring dozens of articles on forensic tox during his career, Dr Hoffman wrote a chapter on postmortem toxicology in Wiley & Sons' *Forensic Chemistry Handbook*. He was a voracious reader of toxicological material and always strove to remain current in his field. I would often drop by Don's office unexpectedly, only to find him reading a journal article on advances in instrumentation techniques, sample preparation, metabolites, new synthetic drug manufacture, and the list goes on.

Don always enjoyed a good meal, dessert (hold the whipped cream), two cups of coffee and finish off the session with a big cigar. These were his most relished moments. The 2019 NEAFS President's Banquet was particularly suited to his favorite indulgences with its "Roaring Twenties" theme. Fortuitously, Don found a cigar shop with walk-in humidor right around the corner from the meeting hotel, where he purchased the cigars used to complete the period theme costume. Always considerate and kind, Don bought the cigar that I am "smoking" as well.

The forensic toxicology community lost a valuable resource, an exceptional scientist, a dedicated toxicologist, and I have lost a dear friend - Donald Hoffman.

Northeastern Association of Forensic Scientists

Meritorious Service Award Nomination Form

The Northeastern Association of Forensic Scientists is accepting nominations for the Meritorious Service Award.

This award is given to a NEAFS member that has a history of providing commendable service to the forensic science community by serving justice through casework, performing research advancing forensic science, training and educating forensic scientists and future forensic scientists, and overall contributions to the NEAFS organization. The nominee must have held the status of Regular Member within NEAFS for at least 10 years to be considered.

All nominations must be received by September 1st. The winner of the NEAFS Meritorious Service Award will be announced during the annual meeting.

The Nomination Form can be found on the NEAFS website www.neafs.org.

George W. Neighbor Jr. Scholarship Grant 2020 Award Recipients

This year's George W. Neighbor Jr. Scholarship Undergraduate recipient is Claudia Sroka from New Jersey Institute of Technology.

Claudia's adoration for forensics and law enforcement started at a young age from the moment she traded in a Barbie doll for a toy gun and some handcuffs. From then on, she wanted no more then to be a CSI in any state police force or government agency. With being the President and Founder of the Forensic Science Student Association, as well as pursuing a Forensic Science major with a concentration in Biology, in addition to a Legal Studies minor, she is well on her way.

Her aspiration is to be a crucial team member where she can use her confidence and knowledge and work under the pressure of completing any puzzle. Studying ethics and law has also allowed Claudia to understand dilemmas and study ethical implications in the court system. The forensic courses developed her understanding of criminalistics in and out of the laboratory setting. An introductory CSI course influenced her aspirations of working in the field and analyzing the components of a scene. "Like Doyle said the 'little things are the most important,' and the crime scene is the first and most crucial step in any case" is one of the many author references Claudia had used throughout her inspiring application. The awards committee wishes Claudia best of luck in her next years of school and gladly presents her with this award.

This year's George W. Neighbor Jr. Scholarship Graduate recipient is Amber Rose from Cedar Crest College

Amber has been captivated by any kind of mystery, big or small, since she can remember. Her passion for forensic science has blossomed because of the infinite number of questions it holds. Ultimately, this has led her to pursue a master's degree in forensic science at Cedar Crest College which has become the opportunity of a lifetime. It has allowed her to learn more about the discipline and discover how she can best use her scientific knowledge for a greater purpose. Amber is looking forward to receiving a graduate degree, bringing her one step closer to achieving her dream of working in a crime laboratory. She wants nothing more than to be involved in this process and help make a positive contribution through forensic science.

Amber was inducted into the international forensic honor society, Delta Delta Epsilon, and served as secretary on the executive board during the 2020-2021 academic year. Additionally, she is looking forward to making progress on her current research project, involving spectroscopic differentiation of aminoindane analogues. The main goal of this research project is to strengthen the analytical profile of eight aminoindane analogues to aid those in the forensic science community that may encounter these compounds in their work.

With these goals and along with additional past experience of research and working as a lab technician, the NEAFS awards Committee is delighted to present Amber with this award.

George W. Chin Memorial Scholarship 2020 Award Recipient

This year's George W. Chin Memorial Scholarship recipient is Kimberly Hane from Cedar Crest College

The NEAFS Awards committee is pleased to present Kimberly Hane with this award.

Kimberly opened her personal statement with this paragraph, "As I watched the DNA travel through the agarose gel, I was hooked. Sitting in my seventh grade classroom and learning about DNA fingerprinting for the first time, I started to envision my future career: a Forensic Biologist. I immediately went to the library and checked out books on forensic science; I scoured the internet on how to become the scientists I always saw on TV. My parents only encouraged my curiosity, allowing me to participate in a summer forensic science internship and later, during my senior year, enrolling me in a biotechnology course through my local community college. When it was time to apply for undergraduate programs, I knew that I wanted to attend a college that would let me explore my interest in forensic science."

In her freshman year at Cedar Crest College, she joined Dr. K. Joy Karnas' laboratory to begin working on one of two current research endeavors. This project involves identifying menstrual blood through differential methylation of specific CpG islands via qPCR-HRM. More recently, she continued a graduate student's thesis work in Dr. Karnas' lab, looking to distinguish expirated and impact spatter patterns by using qPCR to identify the oral cavity-specific bacterium, Streptococcus salivarius, in blood stains.

Both projects have shown Kimberly that she truly enjoys forensic molecular biology research.

Kimberly declared a Forensic Science and Genetic Engineering double major. She has been inducted into four honors societies—Beta Beta Beta, Gamma Sigma Epsilon, Delphi, and Delta Delta Epsilon while being able to maintain a high academic standing in addition to being dedicated to her research. Kimberly is looking to apply to PhD programs in Molecular Biology, Genetics, or Forensic Science come next fall. She hopes to pursue a career as a Forensic Biologist in a crime lab post-graduation before moving into a research position once she obtains professional experience that would benefit any projects that I work on. We wish her the very best.

The Carol De Forest Student Research Grant 2020 Award Recipients

The Carol De Forest Student Research Grant this year was granted to two well deserving students.

1- **Kirsten Sigfried from Cedar Crest College** for her research proposal, "Detection of benzodiazepines in biological samples through optimization of chemiluminescence reagents" (See attached for Paper)

2- **Meghan Chambers from SUNY Albany** for her research proposal, "Addressing a Sample Analysis Crisis: Development of Novel Approaches for Efficient THC Detection and Quantification in Marijuana Edibles, Beverages and Plant Material" (See attached for Paper)

We wish both students best of luck and cannot wait to read their 6-month report.

Kirsten Sigfried from Cedar Crest College

Research proposal:

"Detection of benzodiazepines in biological samples through optimization of chemiluminescence reagents"

Introduction

Biological samples, such as blood, urine, and oral fluid, are routinely submitted to crime laboratories for presumptive toxicological screening in order to detect the presence of illicit drug substances. Toxicology laboratories currently screen for multiple drugs, commonly known as a drug panel, utilizing an enzyme-linked immunosorbent assay (ELISA) (1). This method can be restrictive if there is a limited sample size or if a laboratory only performs analysis using certain drug panels. In toxicology laboratories a five-drug panel, which does not contain drugs such as benzodiazepines, would benefit from a quick, less costly presumptive method to screen for a single drug (1).

Additionally, the commonly abused drugs screened in biological samples cannot be detected 1 – 3 days after ingestion; therefore, samples collected 3 days after ingestion are not typically submitted to a crime laboratory (2). However, benzodiazepines are stored in body fat, and depending on the type of benzodiazepine, can be detected 3 - 30 days after ingestion (3). A simple, efficient detection test for benzodiazepines in samples collected after 3 days of ingestion would allow for improved collection, submission, and analysis times in criminal cases. Oral fluid has been reported to offer an expanded window of detection for benzodiazepines in excess of 9 days post-use (4).

Benzodiazepines are some of the most highly prescribed antidepressant, psychoactive, and tranquilizing medications (4). Along with cocaine, heroin, methamphetamine, phencyclidine (PCP), and Δ^9-tetrahydrocannabinol (THC) tested in a typical drug panel, benzodiazepines are screened because they are highly addictive and abused. The structure of benzodiazepines includes a benzene ring fused with a diazepine ring (5). Figure 1 shows the structure of diazepam, a model benzodiazepine to be tested in this project. These benzodiazepines are known to chemiluminesce in the presence of certain oxidizing agents, which permits them to be detected at concentrations comparable to other techniques such as ELISA and high performance liquid chromatography (HPLC) (5).

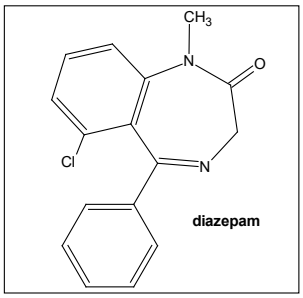

Figure 1: chemical structure of diazepam, one of a class of benzodiazepines

Chemiluminescent detection is a strong, promising method comparable to other techniques, if not better. Various limits of detection for benzodiazepines have been identified through several types of instrumentation and analyses. Using electrogenerated chemiluminescence, a detection limit of 39 ng/mL was reported when detecting flunitrazepam (6). A large study detecting benzodiazepines in blood and urine by using gas chromatography found detection limits of 5 ng/mL for substances such as oxazepam and 40 ng/mL for alprazolam (7). In comparison, using Direct ELISA, the limit of detection range for benzodiazepines was 50 ng/mL (8). Another study was conducted using LC–MS/MS which found limits of detection ranging between

0.01 ng/mL to 0.5 ng/mL for benzodiazepines (9). A chemiluminescent method using an ionic liquid complex was able to detect benzodiazepines at concentrations less than 30 ng/mL (5). Therefore, this method shows how chemiluminescence techniques would be within the range of other commonly used instrumentation for limits of detection.

Chemiluminescence is a luminescent detection technique where light emission is measured from the energy of a chemical reaction (10). The Berthold Lumat^3 tube luminometer is a quick, sensitive instrument for the measurement of chemiluminescence, and the Department of Chemical & Physical Sciences at Cedar Crest College recently acquired this tool for analysis of samples. In order to detect benzodiazepines, the presence of oxidizing agents can enhance the signal and detection limit during chemiluminescence. In previous research, a method using ionic liquids complexed with copper (II) was employed to detect clonazepam and diazepam in urine (5). Figure 2 shows the structure of 1-ethyl-3-methylimidazolium ethylsulfate (EMIM $EtSO_4$), which was coupled with copper (II) to form an oxidation catalyst in this previous study. The authors of this work reported that the reducibility of copper (II) led to the efficient detection of these two drugs. Further investigation of alternative reducible metals and ionic liquids may prove to be better methods to detect these drugs. Preliminary results at Cedar Crest College revealed that clonazepam can be detected by reaction with iron (III) complexed with EMIM $EtSO_4$ with a comparable signal to the copper (II) complex. It is hypothesized that reducible metal ions which have much higher standard reduction potentials may serve as more efficient oxidizing agents in complexes with ionic liquids. Other oxidizing agents such as cerium (IV) (11) and acidified potassium permanganate (12,13) have been reported as alternative substances to detect benzodiazepines and other pharmaceutical compounds in aqueous and biological fluids.

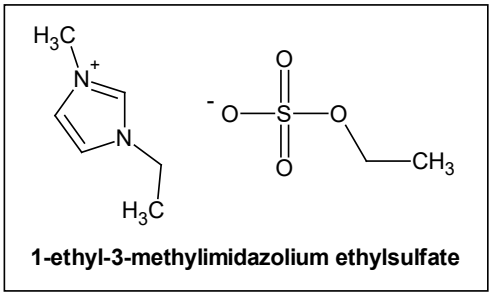

Figure 2: Structure of 1-ethyl-3-methylimidazolium ethylsulfate, an example of an ionic liquid

Using the Berthold Lumat^3 tube luminometer to facilitate a flow injection process, a quick and efficient procedure will be developed to detect benzodiazepines. This research will further explain how current methods can be improved by using complexes with various metal ions and other oxidizing agents. Benzodiazepines are a pervasive class of drugs that are widely abused; however, analyzing urine and oral fluid through chemiluminescence can optimize drug detection for the fast-paced world of forensic science.

Experimental Procedure

Building on previous work, this proposed project will investigate the optimal oxidizing agent to detect a variety of benzodiazepines in aqueous solutions, and then progress to detect these compounds in biological samples such as urine and oral fluid. Three methods which will be compared in this research project include acidified potassium permanganate, acidified cerium (IV) sulfate, and catalyst complexes between reducible metals and imidazolium-based ionic liquids. These three approaches will be systematically explored to determine the optimal oxidizing agent to permit the detection of benzodiazepine chemiluminescence using a Berthold Lumat^3 tube luminometer.

Potassium permanganate in acidic medium is a common strong oxidizing agent which has been reported to react with various drug compounds to cause chemiluminescence. Our experimental approach will follow a published method used to detect loprazolam (13). In this method, formic acid (0.94 M) is used to acidify the potassium permanganate (2×10^{-4} M) solution. This solution would be injected into samples of benzodiazepines (supplied by Cerilliant) in aqueous solution in the Lumat^3 tube luminometer. Successful detection of benzodiazepines would be followed with subsequent tests to identify the limit of detection for these drugs using the tube luminometer.

Following a method published by Campiglio, cerium (IV) sulfate (10 mM) in sulfuric acid (0.25 M) will be injected into prepared samples of benzodiazepines in aqueous solution using the Lumat^3 tube luminometer (11). Various benzodiazepines such as diazepam, clonazepam, and nitrazepam, as well as metabolites, such as nordiazepam and 7-aminoclonazepam, may be examined to determine how selective these methods may be based on the structure of these drugs.

As a third method for comparison, reducible metal ions will be complexed with ionic liquids to form oxidation catalysts which will incite chemiluminescence when reacting with benzodiazepines in the presence of hydrogen peroxide (5). Metal chloride salts (0.19 mM) will be combined with EMIM $EtSO_4$ (1.2 M) and a range of concentrations of benzodiazepines in a buffered solution. To this solution, hydrogen peroxide (0.2 mL, 4 vol%) will be injected to incite chemiluminescence, and signal will be recorded with the Lumat^3 tube luminometer. Reducible metals to be investigated include copper (II), iron (III), silver (I), and cerium (IV). Ionic liquids such as 1-butyl-3-methyl-imidazolium (BMIM) chloride will also be tested to optimize the chemiluminescence detected by reaction with these compounds.

Systematic testing of samples with known concentrations of benzodiazepines in aqueous solutions will be analyzed using the Lumat^3 to determine the method which yields the highest chemiluminescence signal. Blank solutions will be used and samples will be tested in triplicate to ensure reproducible results. Following analysis of samples in aqueous solution, toxicological samples such as urine or oral fluid will be analyzed to detect benzodiazepines. Statistical analysis will be employed to determine if these methods serve as significantly improved tests to detect these drugs.

Prior to using human urine or oral fluid samples, Institutional Review Board (IRB) approval through the institution will be pursued.

Expected Results & Contribution to Forensic Science

After comparison of these oxidizing agents for the detection of benzodiazepines with chemiluminescence, we will report the optimal method for analysis of these compounds in biological fluids such as urine and oral fluid. Then, this method will be further refined to determine the linear dynamic range for detection, and other figures of merit such as the limit of detection and the limit of quantitation for the Lumat^3 tube luminometer. This work will broaden the understanding of how common benzodiazepines, which are controlled substances with the potential for abuse and use in drug-facilitated sexual assault (14), may be detected using small sample sizes and minimal waste production. Beyond detecting these drugs in biological fluids, this work could be expanded to testing alcoholic beverages for the presence of these compounds (14).

Budget

Expense	Supplier	Amount
Travel to NEAFS meeting 2021 (10% of total budget)		**$250.00**
Oxidizing Agents (cerium (IV) sulfate, iron (III) sulfate, etc.)	Alfa Aesar	$250.00
Ionic Liquids (variety of $BMIM^+$ and $EMIM^+$ salts)	Alfa Aesar	$1100.00

Benzodiazepines (diazepam, clonazepam, flurazepam, nitrazepam, flunitrazepam, etc.)	Cerilliant	$500.00
Artificial biological fluids	VWR	$250.00
Acid reagents (formic acid, etc.)	Alfa Aesar	$150.00
Chemicals & Supplies Total		**$2,250.00**
Total		**$2,500.00**

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Meghan Chambers from SUNY Albany

Addressing a Sample Analysis Crisis: Development of Novel Approaches for Efficient THC Detection and Quantification in Marijuana Edibles, Beverages and Plant Material

A. INTRODUCTION

In the National Institute of Justice (NIJ) 2019 *Report to Congress: Needs Assessment of Forensic Laboratories and Medical Examiner/Coroner Offices*, the Department of Justice identified several areas that require focused attention to improve criminal justice practice in the United States. Among the greatest challenges identified are those that have emerged as a consequence of the "legalization and decriminalization of marijuana," and the report indicated that the issue requires the "implementation of new testing strategies," and that "testing methods must be developed to test THC (tetrahydrocannabinol)," in a variety of plant-based substances, edibles and extracts.[1] Methods currently used for the detection and/or quantification of THC and other cannabinoids include GC-MS,[2] GC-FID,[3] LC-MS,[4] and HPLC,[2,3] and despite the fact that crime labs have decades of experience with analyzing THC (the major psychoactive component of marijuana), few majors changes in sample analysis protocols that substantially reduce the sample preparation steps have been introduced. *The hypothesis being explored in this proposal is that the unique capabilities of direct analysis in real time-high resolution mass spectrometry (DART-HRMS) can be used for the rapid and streamlined detection of THC in complex matrices, such as plant material and the myriad of marijuana-derived products created for human consumption, including foods and beverages.* It is further proposed that this approach can be used for rapid quantification of THC in complex matrices, and that THC can be distinguished from cannabidiol (CBD) and other phytocannabinoids (natural cannabinoids) without the need for extensive sample processing steps. The proposed work will be accomplished through pursuit of the following four specific aims:

***Specific Aim I*:** Demonstration of the utility of DART-HRMS as a presumptive test that can be used for the rapid detection of THC in complex matrices, with minimal to no sample pretreatment steps.

***Specific Aim II*:** Demonstration of the ability to distinguish THC from cannabidiol (CBD) and other phytocannabinoids in *Cannabis* using DART-HRMS.

***Specific Aim III*:** Development of DART-HRMS validated protocols for the quantification of THC and CBD.

***Specific Aim IV*:** Development of optimized procedures for the recovery of THC from complex matrix edibles, beverages and plant material for subsequent quantitative analysis of THC.

B. BACKGROUND AND SIGNIFICANCE OF RESEARCH PROPOSED

Cannabis sativa (aka "Marijuana") products are the most widely trafficked drugs worldwide and the most commonly used illicit drug in the United States.[5] Although classified federally as a Schedule I controlled substance, marijuana use is becoming more extensive, with increasing state legislation for medicinal and recreational use.[6,7] A consequence of state-legalized retail sales of marijuana is the popularity of edible marijuana products, referred to as "edibles". These edibles are food or beverage items made with marijuana or marijuana oils, and they provide users with an alternative to smoking or vaporizing the drug.[8] However, because edibles are consumed orally, weight, metabolism and gender all contribute to how quickly the user feels the effect. Furthermore, the delayed high that is a consequence of administration by the oral route results not only in overconsumption leading to overdoses, but also in a high that can be more intense and longer lasting in comparison to administration by inhalation.[6,9,10] These new edibles raise public health concerns, resulting in an increased number of emergency room visits[11] (even in states where marijuana has been legalized), and enhance the risk of accidental consumption by children, the elderly, and animals.

There is little uniformity among the protocols conventionally used in forensic crime laboratories to analyze marijuana and its derived products, and they are oftentimes cumbersome and require extensive sample preparation, time-consuming analysis, complex data processing, and the use of multiple analytical instruments. The analysis of marijuana edibles in particular tends to dirty the instruments and create other instrument analysis problems, including contamination and difficulties with subsequent runs, resulting in significant downtime and consequent casework backlogs. The explosive rise of *Cannabis* use and the myriad of THC-laced products introduce major challenges for sample analyses involving the detection and

quantification of THC, because highly nuanced approaches are often required for *each* type of complex matrix. For example, the inherent differences in their matrices are such that the approach that might be developed to analyze a gummy candy would be quite different from that used to analyze chocolate or popcorn. This contributes to the heterogeneity of aspects of the legislation and regulation of *Cannabis* and THC-infused products throughout the United States.

To address this crisis and the concerns of forensic practitioners, is it crucial to rethink the testing strategies for the detection and quantification of THC in complex matrices, including plant material and edible products. The ambient technique DART-HRMS circumvents some of the most frequently reported problems associated with analytical and forensic analysis of marijuana and THC-infused products because: (1) samples can be triaged and analyzed in their native form (i.e. no sample preparation); (2) instrument downtime is greatly reduced; (3) there is no dirtying of the instrument and/or accessories that interferes with subsequent analyses; and (4) it has quantification capabilities with minimal sample pretreatment steps (i.e. simple extraction protocols). Even though an extraction step would be necessary to enable quantification of THC, it is still more advantageous to use this method as opposed to GC-MS methods for the reasons previously mentioned. The approach can be designed to be high-throughput and can thus accommodate large sample volumes, and there is minimal training necessary to properly and effectively collect reproducible data. The primary goal of this research project is to develop a DART-HRMS-based approach that practitioners can use for routine, rapid and simplified analyses of the THC content in *C. sativa* plant material and complex edible matrices, while avoiding some of the most common problems encountered using conventional methods for the analysis of marijuana associated products.

C. EXPERIMENTAL PROCEDURES

Specific Aim I:

The primary goal of Specific Aim I is to demonstrate the utility of DART-HRMS as a presumptive test that can be used for the rapid detection of THC in complex matrices, with minimal to no sample pretreatment steps. A DART ion source coupled to a high-resolution time-of-flight mass spectrometer will be used to analyze cannabinoid standards, plant material, and complex edible matrices spiked with cannabinoids under soft ionization and collision-induced dissociation (CID) conditions to obtain mass spectra of the samples. This will confirm that analytes of interest can be detected by typical helium-DART-HRMS analysis. The JEOL AccuTOF high-resolution mass spectrometer will be operated in both positive-ion and negative-ion modes. Edibles will consist of food and beverage samples prepared in-house, in addition to commercially available products. To perform these analyses, edibles and plant materials will be suspended using tweezers in the open-air gap between the ion source and mass spectrometer inlet for approximate 5 s (Figure 1A). Beverages will be sampled directly by analyzing the coated surface of a melting point capillary that has been dipped into the liquid (Figure 1B). Alternatively, they may be analyzed following freeze-drying. Samples that exhibit a high-resolution mass corresponding to protonated THC or CBD (i.e. *m/z* 315.232) can be triaged for further analysis (such as, for example, the differentiation of cannabinoids and/or the quantification of analytes of interest). TSSPro 3 software will be used for data processing including averaging, background subtraction, and peak centroiding, and Mass Mountaineer will be used to perform mass spectral analyses.

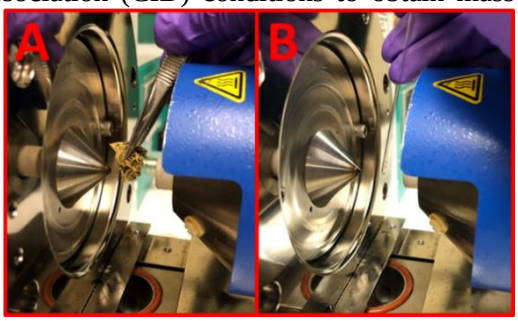

Figure 1. Illustration of how *C. sativa* plant material and edibles (Panel A) and beverages/liquids (Panel B) can be analyzed using DART-HRMS.

Specific Aim II:

The primary goal of Specific Aim II is to demonstrate the ability to distinguish THC from CBD and other phytocannabinoids in *Cannabis* using DART-HRMS. To accomplish Specific Aim II, various instrumental parameters and derivatizing agents will be used to examine the optimal differentiation of cannabinoids. The parameters used in Specific Aim I will be implemented in the pursuit of Specific Aim II. Derivatizing agents such as MSTFA, BSA, BSTFA, HMDS and TMCS will be explored. Cannabinoid

standards will be analyzed individually and in mixture forms. The detection limits for THC, CBD, and the other phytocannabinoids using DART-HRMS will be determined.

***Specific Aim III*:**

The primary goal of Specific Aim III is to develop DART-HRMS validated protocols for the semi-automated quantification of THC and CBD. Specific Aim III will be accomplished by utilizing DART-HRMS for the quantification of THC and CBD in complex matrices. The DART-HRMS will be operated using the parameters listed above in Specific Aim I. As demonstrated in the preliminary data section (below), the DART-HRMS 20 V and 90 V spectra of THC and CBD are distinguishable after derivatization with MSTFA. Also displayed in the preliminary data is the differentiation of 15 cannabinoid standards in negative-ion mode under CID conditions. Linear standard curves for THC and CBD will be developed and used to quantify their content in quality control standards and various complex matrices. Further investigation of alternatives to deuterated internal standards will be conducted. This could include the use of fragment ions from the THC standard or using statistical analysis of the fragment peaks in order to quantify THC and CBD.

***Specific Aim IV*:**

The primary goal of Specific Aim IV is to develop optimized procedures for the recovery of THC from complex matrix edibles, beverages and plant material for subsequent quantitative analysis of THC. Although the method described in Specific Aim I for triaging samples does not require sample pretreatment, Specific Aim IV will be accomplished by establishing the optimal sample preparation, extraction method and solvent system for experiments that require the quantification of THC. Investigations will be conducted to ensure that each element of the method results in maximum recovery and efficiency. The first step in this investigation will be to prepare the samples for extraction. To create homogeneity within each sample and consistency between samples, extreme grinding can be implemented. Where fluids and soft materials (e.g. ice cream, gummies) are concerned, subjecting these samples to cryo-freezing followed by pulverization will lead to maximum surface area exposure to the solvent, thereby increasing extraction efficiency. Some edible products and plant materials may not require the additional cryo-freezing step because they are already in a form that will homogenize well through grinding alone. After this step, the optimal solvent system for each type of sample (beverages, edibles, and plant materials) will be investigated, followed by the calculation of percent recoveries and determination of matrix effects for each sample type. The THC recovered will be quantified using the standard curves created in Specific Aim III.

D. PRELIMINARY RESULTS

The following data are presented to show proof-of-concept for the aims of the proposed work. The results fall under the umbrella of Specific Aims I, II and III, and illustrate that DART-HRMS can be used for rapid detection and quantification of THC in complex matrices, in addition to the differentiation of THC from other cannabinoids present in *Cannabis*. *It should be noted that our laboratory has in hand the necessary state and federal Schedule I licenses to handle C. sativa and derivatives of it.*

Specific Aim I:

The focus of Specific Aim I is to rapidly detect THC in complex matrices, with minimal to no sample pretreatment steps, by DART-HRMS. For the preliminary study, authentic standards of THC, CBD and other cannabinoids were analyzed by DART-HRMS. When analyzing THC and CBD standards, a peak consistent with the protonated mass $[M+H]^+$ of THC and CBD was detected as *m/z* 315.232. Studies into the detection of these analytes in complex matrices were initiated by analyzing the following: (1) hemp plant material; (2) complex edibles prepared in-house using THC and CBD standards; and (3) commercial CBD products.

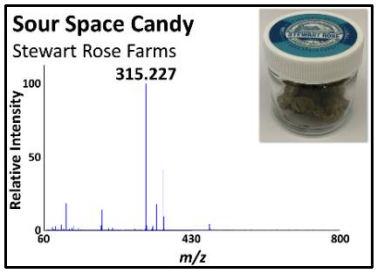

Figure 2. Representative spectrum of hemp analyzed by DART-HTMS under soft ionization conditions over a mass range of *m/z* 60-800.

Hemp, which is a variety of *C. sativa*, was analyzed by DART-HRMS by using tweezers to suspend samples between the DART ion source and mass spectrometer inlet (see Figure 1). Figure 2 shows a representative spectrum of hemp that was analyzed in positive-ion mode

over a mass range of *m/z* 60-800. The spectrum demonstrates the rapid detection of CBD at nominal *m/z* 315.

Several THC- and CBD-infused edibles, such as gummies, chocolates, and baked goods, were prepared in-house by spiking the treats with known amounts of THC or CBD and analyzed by DART-HRMS. It is important to note that these amounts reflect the doses typically present in commercial *C. sativa* edibles. The resulting spectra, which are shown in Figure 3, indicate detection of THC or CBD in complex edible matrices through observation of nominal *m/z* 315. Even among the other ingredients present in these edibles, the peaks representing THC and CBD are readily detectable by DART-HRMS. Finally, six commercial CBD products were purchased and analyzed by DART-HRMS, two of which are shown in Figure 3. All of the corresponding spectra contained a peak consistent with the protonated mass of CBD.

The results from Specific Aim I experiments show that DART-HRMS can be used to rapidly detect cannabinoids in complex matrices such as plant material, in-house prepared edibles, and commercial products.

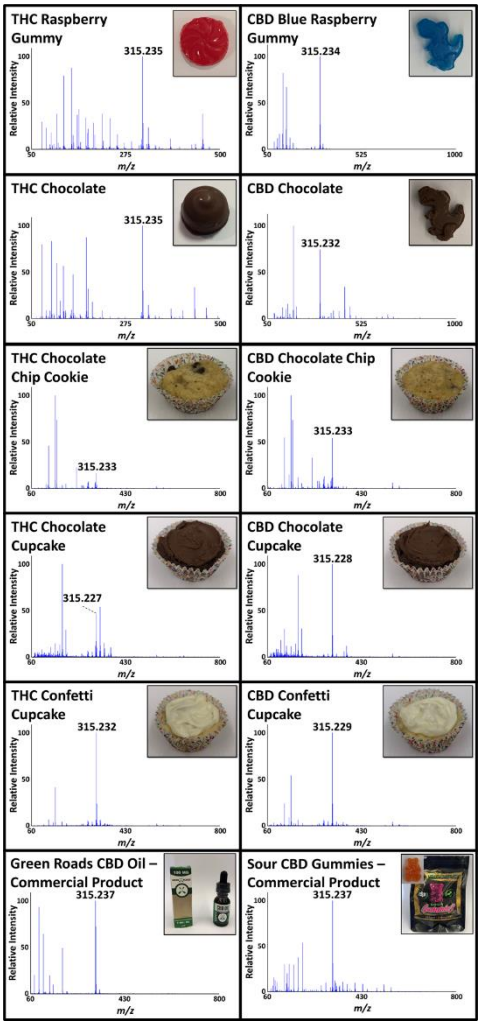

Figure 3. DART-HRMS spectra of THC- and CBD-infused edibles and representative commercial CBD products.

Specific Aim II:

The focus of Specific Aim II is to differentiate THC from CBD and other phytocannabinoids present in *Cannabis*. Fifteen cannabinoid standards were analyzed by DART-HRMS using the capillary tube approach (see Figure 1) in positive-ion mode at 350 °C under soft-ionization conditions (20 V). The results showed the difficulty of distinguishing between isobaric cannabinoids under these conditions. A head-to-tail plot (a rendering of two mass spectra that enables ease of comparison) of THC (blue) and CBD (red) is shown in Figure 4A, which illustrates the highly similar spectra produced when analyzing THC and CBD under these conditions. Therefore, sample derivatization was investigated, and it was found that THC and CBD could be readily distinguished under both soft ionization and CID conditions when the derivatizing agent MSTFA was used. Engagement by the derivatizing agent of the single –OH group in THC and the two –OH groups in CBD results in the two compounds being converted into molecules with protonated $[M + H]^+$ masses of 387.272 and 459.312, respectively (Figure 4B). Once derivatized, they also exhibit diagnostic fragmentation patterns under CID conditions (Figure 4C).

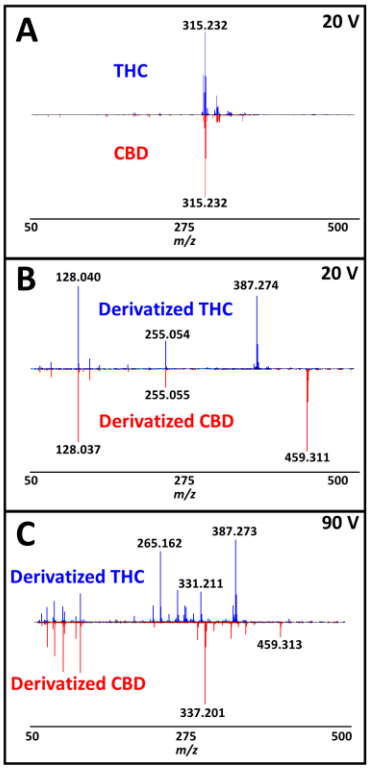

Figure 4. The DART-HRMS spectra of THC and CBD standards rendered as head-to-tail plots. Panel A shows the 20 V spectra of THC (red) and CBD (blue). Panel B illustrates the 20 V spectra of derivatized THC and CBD. Panel C is comprised of the 90 V spectra of derivatized THC and CBD.

Alternative DART-HRMS analysis parameters in the absence of derivatization were also investigated. Samples were subjected to CID conditions (90 V) in negative-ion mode. This adjustment revealed

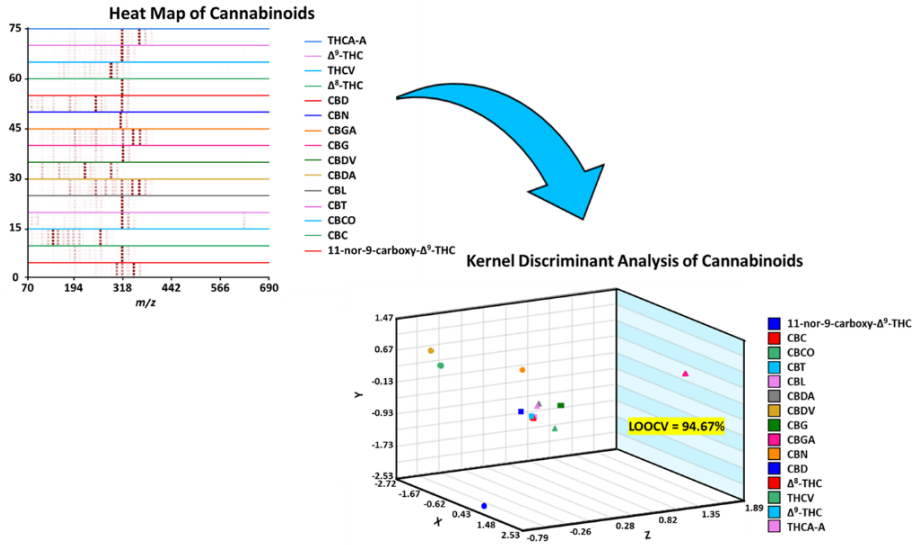

Figure 5. A heat map and Kernel discriminate analysis (KDA) plot of the mass spectral profiles of 15 cannabinoid standards analyzed by DART-HRMS.

distinctive mass spectral features. After the 15 cannabinoids standards were analyzed in replicates of five, Mass Mountaineer software was used to subject the data to multivariate statistical analysis. Figure 5 illustrates the resulting data rendered as a heat map, showing *m/z* values on the x-axis and the individual spectra on the y-axis. The colored bands represent the intensity of the peak; the darker the band, the higher the peak intensity at the corresponding *m/z* value. The similarities and differences observed in this heat map rendering prompted the use of Kernel Discriminate Analysis (KDA) to classify these cannabinoids. Clustering of replicates and the separation between different cannabinoids showed that the phytocannabinoids present in *C. sativa* can be differentiated under the proper instrumental parameter conditions. A leave-one-out cross-validation (LOOCV) for this KDA plot was performed. This internal validation process provides a measure of the model's accuracy of prediction, and functions by removing one data point at a time, rebuilding the model without that point, reinserting it into the model as an unknown, and then determining how the model will classify the "unknown". The LOOCV was 94.67%, and the results indicate that differentiation of cannabinoids through statistical analysis is possible, but more replicates and cannabinoid standards will need to be analyzed to develop a comprehensive model system.

Specific Aim III:

The focus of Specific Aim III is to develop DART-HRMS-based protocols for the quantification of THC and CBD. For proof-of-concept, two sets of solutions with varying concentrations of MSTFA-derivatized THC and CBD were made and analyzed by DART-HRMS under soft ionization conditions. Each set of samples contained either THC or CBD concentrations ranging from 0 to 500 mg/L, and were spiked with internal standard concentrations at 25 mg/L. Dip-It tips (melting point capillary tubes with one end closed) that were dipped into Eppendorf tubes containing 500 µL of each solution were suspended in a linear rail system (for semi-automation) and analyzed in triplicate. This system presented the samples to the ion source at a rate of 1 mm s^{-1}, and standard curves were created from the results. For the THC curve run at 20 V, peak area ratios developed using the areas of the protonated MSTFA-derivatized THC peak (*m/z* 387.272) and protonated THC-d_3 peak (*m/z* 318.251) were plotted against the THC concentrations of the calibrators (Figure 6). The CBD curve was developed in the same way, using the protonated MSTFA-derivatized CBD peak (*m/z*

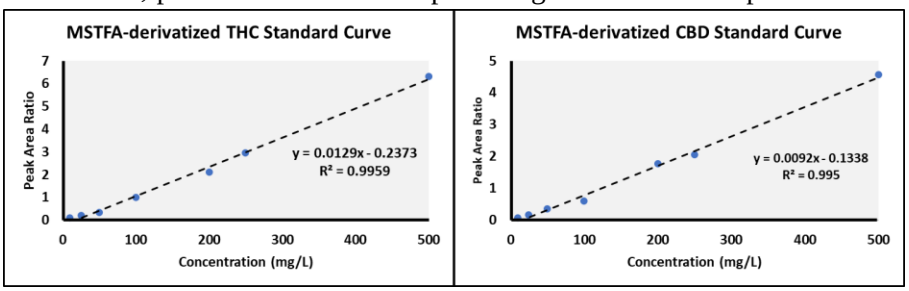

Figure 6. The standard curves derived from the peak areas of the *m/z* values 387.272 and 459.312 for THC and CBD, respectively, divided by the peak areas of the internal standards THC-d_3 and CBD-d_9 respectively, plotted against the concentrations of THC and CBD.

459.312) and protonated CBD-d_9 peak (*m/z* 324.289), and is also shown in Figure 6. Both of the curves yielded R^2 values of greater than 0.99, and demonstrate potential for semi-automated quantification of THC and CBD by DART-HRMS.

E. EXPECTED RESULTS AND CONTRIBUTION TO FORENSIC SCIENCE

The results of this work will have a substantial and potentially revolutionary impact on forensic science and criminal justice practice in the United States. The innovative DART-HRMS-based approach for rapid analysis of complex matrices, including plant material, edibles of various types and beverages, will circumvent several challenges routinely encountered in current forensic analyses for THC and CBD. It will dramatically reduce the time and major instrument, human resource, and other financial investments required to detect and quantify THC and CBD in numerous sample types. The results will establish a foundation for consideration of alternative approaches to the legislation of marijuana edibles. Additional anticipated dividends include: (1) reduction in crime lab sample testing backlogs; (2) streamlining of sample analysis protocols; (3) reduction of chemical reagent costs; (4) re-deployment of laboratory equipment such as GC- and LC-MS instruments for other necessary types of analyses; and (5) more timely completion of sample analyses so that prosecutions can be expedited.

F. BUDGET FOR THE PROJECT

In order to demonstrate the application of this method to a wide range of marijuana product types, funds are needed to purchase supplies to prepare in-house THC- and CBD-laced products, in addition to purchasing *Cannabis* plant material and commercially available products. Funds are also needed to optimize experimental methods, which requires the acquisition of chemical standards and capillary tubes. Since some of the results obtained in this investigation will be disseminated at the 2020 NEAFS Annual Meeting, funds are also requested to defray the cost of conference attendance.

Item	Average Cost per Item	Number of Units	Total Cost
Chemical Standards	$20.00	15	$300.00
Capillary Tubes (case of 20)	$270.00	1	$270.00
Cannabis Plant Material	$16.00	30	$480.00
Baking Ingredients (variety)	$200.00	1	$200.00
Commercial *Cannabis* Products	$20.00	50	$1,000.00
Travel to NEAFS Annual Meeting 2020	$250.00	1	$250.00
Amount Requested from NEAFS			$2,500.00

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ATTENTION STUDENTS:

Are you a current full-time undergraduate student in your junior or senior year, or are you either a part-time or full-time graduate student completing his or her degree in a forensic program at a regionally accredited institution located in the Northeastern U.S. (Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, Maine, New Jersey, New York, and Pennsylvania)?

Then you are eligible to apply for:

George W. Neighbor Jr. Memorial Scholarship (undergraduate) - Award is $1750
George W. Neighbor Jr. Memorial Scholarship (graduate) - Award is $1750
George W. Chin Memorial Scholarship – Award is $2000

Carol De Forest Forensic Science Research Grants - Award is $2500
***Note** – eligibility is for both full-time undergraduate and graduate students

** **Note –** Two Research Grants will be Awarded.

All submission materials for either the scholarships or the research grants must be completed, and electronically submitted by April 30th. The 2021 Awards recipients will be notified no later than September1st.

For more information and Scholarship/Research Grant forms please go to http://www.neafs.org/

Questions or comments? Please email Awards@NEAFS.org

THE GEORGE W. CHIN MEMORIAL SCHOLARSHIP

Are you a current full-time undergraduate student in your junior or senior year, or are you either a part-time or full-time graduate student or in your first two years of your Ph.D. Forensic Science program? Do you attend a college or university within the area from which NEAFS draws it members (CT, NY, NJ, PA, VT, NH, ME, RI, MA)? Do you demonstrate excellence in your academic program?

If Yes, you are eligible to apply for the George W. Chin Memorial Scholarship!

The award is $2000.00 as well as Associate membership for one year in the NEAFS organization. Membership will be granted to a current member or active applicant as well as a non-member (the application fee will also be included).

All submission materials for the Memorial Scholarship must be completed and electronically submitted by April 30. The award recipients will be notified no later than September 1.

For more information and to obtain the application forms, go to http://www.neafs.org

If you have any questions please email: awards@neafs.org

2021 Training Scholarship Fund

The Northeastern Association of Forensic Scientists (NEAFS) is proud to offer its members a 2021 Training Scholarship Fund. Regular members, in good standing, are eligible to receive up to $400 towards training, workshop or non-NEAFS meeting registration expenses. Detailed instructions and application forms are available on the NEAFS website. Simply click the “Training” link at the top of the screen and scroll down to the “NEAFS Training Scholarship Forms”. The current application period is January 1st, 2021 to December 31st, 2021. Reimbursements will be issued on a first come, first serve basis and funding is limited. If you plan to attend a non-NEAFS meeting workshop, training or course during this application period and will not be funded by your agency or any other non-NEAFS related entity, we highly encourage your swift application for the 2021 Training Scholarship Fund. Please visit the NEAFS training website to take advantage of this great NEAFS opportunity and to view upcoming training opportunities!

Webinars

Verogen On-Demand Webinar
Forensic Genetic Genealogy: An Emerging Game Changer for Cold Case Resolution

Forensic genetic genealogy (FGG) is revolutionizing cold case investigations by producing previously unobtainable investigative leads. When traditional methods are inconclusive or all other options are exhausted, genealogy databases offer a new route to identifications. GEDmatch, one of the most widely known databases, has proven its effectiveness by helping law enforcement identify more than 70 previously unknown suspects.

If you are a forensic scientist, law enforcement professional or genealogist interested in learning more about FGG then register for this free educational webinar where experts will provide real-world insights regarding the impact of FGG from the complementary viewpoints of forensic scientists and law enforcement.

Register now to access the webinar on demand.

MAFS Online Training Opportunities

Good morning! We offered this to our MAFS Members, but thought we would open up the opportunity to all forensic scientists. If you are interested, feel free to pass along. The early webinars are 8-hours and the 2019 is a 4-hour session.

In an effort to offer some training opportunities, MAFS has made archived versions of the Leadership Symposium webinar available for you to view. Maybe you regretted missing the webinar the first time around? Now is your chance to revisit them and sharpen your saw! Unfortunately we cannot provide you a certificate for viewing the webinars, but we hope this can be helpful for those that may be missing training opportunities or for those that are working from home.

If you would like to view the webinars, this link will send you to the google drive where they are kept. You will find webinars on Transitioning to Leadership (2016), Communication (2017), Motivation (2018), and Leading Change (2019). Pdf's of the slides are available for the 2017 and 2019 webinars. A big thank you to Brian Hoey and Brooke Ehlers for making these webinars available!

The MAFS Training and Education Committee is diligently working to offer you more virtual training opportunities, so stay tuned! We hope everyone is staying safe and healthy!

Visit neafs.org under the merchandise tab!

GET YOUR NEAFS GEAR!

NORTHEASTERN ASSOCIATION OF FORENSIC SCIENTISTS

2021 TRAINING SCHOLARSHIP FUND

OPEN APPLICATION PERIOD: JANUARY 1st, 2021 - DECEMBER 31st, 2021

APPLICATION REQUIREMENTS

The Northeastern Association of Forensic Scientists (NEAFS) is proud to offer its members a Training Scholarship Fund (TSF). Members in good standing are eligible to receive up to $400 towards training, workshop or non-NEAFS meeting registration and travel expenses. Individuals will only be allowed reimbursement once per application period. Any NEAFS Annual Meeting expenses are ineligible to receive funding. Reimbursement will occur upon receipt of a certificate showing successful attendance and completion of the course along with an article summarizing the course for the NEAFS newsletter.

APPLICATION INSTRUCTIONS

Applicants must submit a *Pre-Approval Application* prior to attending the training for which they wish to obtain funding. All applications must be complete with a brief course description, statement as to how the applicant will benefit from attending the training and justification for receiving funding (i.e. insufficient employer funding or continuing education requirements).

Notification will be given to each applicant upon receipt of the *Pre-Approval Application.* This notification lets the applicant know that their submission has been received by the Awards Chair at NEAFS and is being reviewed. Applicants can expect to be informed of the acceptance or rejection of their application within 60 days of receiving this *Pre-Approval Application* notification.

Upon successful attendance and completion of the training, all pre-approved applicants must submit a *Reimbursement Application* along with supporting documentation. Whenever possible, a certificate should be provided as proof of attendance and completion. If a certificate is not issued, or is unavailable, a letter from the organizer/ instructor verifying the applicant's successful attendance and completion shall suffice. Each Training Scholarship Fund recipient is required to contribute to NEAFS and its members by publishing a written article in the Newsletter. *Reimbursement Applications* will only be considered complete when accompanied by a 1000-word (minimum) course summary.

All application materials can be found on the NEAFS website. Please submit all inquiries, applications and supporting documentation to: awards@neafs.org.

Certification Reimbursement

The NEAFS Board of Directors has voted to reimburse the American Board of Criminalistics and International Association for Identification exam sitting fees for five NEAFS members (regular or associate) in good standing who pass the ABC or IAI exam. This offer is for any exam completed in 2020. After passing the examination, please fill out the Certification Reimbursement Form (www.neafs.org) and email the completed form with proof of passing the exam to the NEAFS Certification Chair Peter Diaczuk at certification@neafs.org. The reimbursement is based on a first come first served basis. Remember you must pass the ABC or IAI exam to be considered for reimbursement.

TThe following are current examinations that are offered:
Comprehensive Criminalistics Examination (CCE)
Drug Analysis (DA)
Molecular Biology (MB)
Fire Debris Analysis (FD)
Hairs and Fibers (HF)
Paints and Polymers (PP)

For more information about the examination sitting, please contact Peter Diaczuk at certification@neafs.org.

For more information about the examination and the American Board of Criminalistics, please visit http://www.criminalistics.com.

Historical facts – NEAFS

- "NEAFS was founded in 1975 by a group of dedicated forensic scientists dedicated to improving the professional status and technical capabilities of individuals engaged in all phases of forensic science." "To accomplish its goals, NEAFS conducts continuing education seminars featuring workshops and special training sessions. The Annual Meeting…presents a contagious atmosphere of scientific exchange and social congeniality."Mark Lewis, President 1980
- The first Editor of the newsletter in 1976 was R.E. Gaensslen
- The first meeting of the Executive Board was on May 1, 1976 by President Angelo Fatta. Also in attendance were Vincent Crispino, R.E. Gaensslen, Thomas Kubic, Carl Moller and Alexander Stirton.
    - On this first meeting, it was stated that there were 211 members and this number included applicants. Six of those members were upgraded to Regular members.
    - The first annual meeting was being discussed. The annual meeting was to be a one day meeting on or about October 23, 1976. Tentative sites were John Jay College or C.W. Post College. The schedule was: 8am-12pm Coffee and Registration, business meeting and split sessions; Lunch; 1pm-5pm two general interest talks, split sessions, mixer and dinner. The split sessions included serology, microscopy, arson, toxicology and drug identification. The general interest talks would be short and would be concerning aspects of forensic science that would be unfamiliar or unusual to most members.
- NEAFS was incorporated by the State of Connecticut on May 12, 1976. Vincent Crispino, Thomas Kubic and Henry Lee were the Incorporators.
- The NEAFS newsletters were published by the Forensic Sciences Foundation which was located in Maryland.
- A joint meeting was held on April 15-16 with MAAFS in New Jersey as well as the Annual Meeting of NEAFS on October 29th in 1977.
- Dr. Peter De Forest chaired the Hairs and Fibers Session during the Second Annual Meeting. Alexander Stirton chaired the Serology Session and Dr. Jesse Bidanset chaired the Toxicology Session during the Second Annual Meeting.
- The newsletters included information from other regional organizations as well as NEAFS.
- In 1977, the BOD acted as an ad hoc Education Committee and set up two courses intitled: "Forensic Microscopy" and "Introduction to the Forensic Applications of Infrared Spectroscopy".
- A luncheon was held during the 3rd Annual meeting of NEAFS and consisted of salad, a choice of roast beef or filet of sole, dessert and a beverage for $6.00. Cocktails were $1.50 and beer and wine were $1.00.
- In 1978, the annual meeting was increased to a two day program instead of one day.
- George Neighbor volunteered to chair the Paint analysis program for the 1978 Annual Meeting.
- In 1978, NEAFS sponsored a training course entitled "Basic Bloodstain Analysis" and it was taught by Dr. Henry Lee, Dr. R.E. Gaensslen and Dr. Peter De Forest. This course was held at the University of New Haven.
- George W. Neighbor was the Secretary of NEAFS in 1978.
- Thomas A. Kubic was voted in as a Life Member of NEAFS while he was President in 1978.
- In 1979, Chris Chany was approved to become a Provisional member from a student member and Peter Diaczuk was approved to be a Corresponding member.
- George W. Neighbor was President-elect in 1980.
- Travel reimbursement for mileage was 17 cents/mile in 1980.
- NEAFS had 400 members in 1980.
- In May 1980 in Louisville Kentucky, NEAFS participated in the first multi-regional association meeting.
- George W. Neighbor had a BA degree in Chemistry from Rider College and a MS in Forensic Science from John Jay College. He worked as a Principal Forensic Chemist for the NJSP in the North Regional Laboratory in Little Falls, NJ where he supervises the trace evidence and bio-chemical units. Prior to working with the NJSP, He has

twenty years of industrial research experience in materials analysis. He served as Secretary for two terms (1978-79) and was a member of the AAFS and the Forensic Science Academy. George became President of NEAFS in 1981 – the 7th year in NEAFS history. George stated at the end of his President's message in the March 1981 newsletter "Now you can call me George, or you can call me G.W., or you can call me George W., or you can call me Hi Neighbor". In 1989, George presented "Trace Evidence Never Grows Old" during the Criminalistics Session.

- In 1997, the Scholarship award was renamed the George W. Neighbor Jr. Memorial Scholarship
- In 1980, the Annual Meeting budget was $2000.
- 1980 Goals of NEAFS
    - Exchange ideas and information among professionals in the field
    - Promote recognition of forensic science as an important part of the justice system
    - Sponsor and organize seminars, workshops, and special training sessions
    - Represent the membership on national issues affecting forensic science
    - Encourage research and development
    - Stimulate implementation of new methods and techniques
    - Establish professional standards
    - Provide advice on educational curricula, legislation and other matters affecting the profession
    - Arbitrate professional disputes
    - Foster friendship and collegiality among the forensic scientists of the Northeast
- For the 10th Annual Meeting, the room rate was $55 (single or double).
- The 12th annual meeting was the first meeting held in New England in Peabody, MA. A clam bake was scheduled.
- The door prizes that were given out at the 11th Annual Meeting were a Commador 64 Computer, Cannon AE1 Camera, Reflecting Telescope and an AM-FM radio.
- Our current method of visiting the exhibitor booths and obtaining confirmation of the visit goes back to at least the 9th Annual Meeting in 1983.
- The door prizes given out at the 14th Annual Meeting which was donated by Perkin-Elmer were a Video Cassette Recorder, Compact Disk Player, Scientific Programmable Calculator, Cordless Telephone and a Sony Walkman.