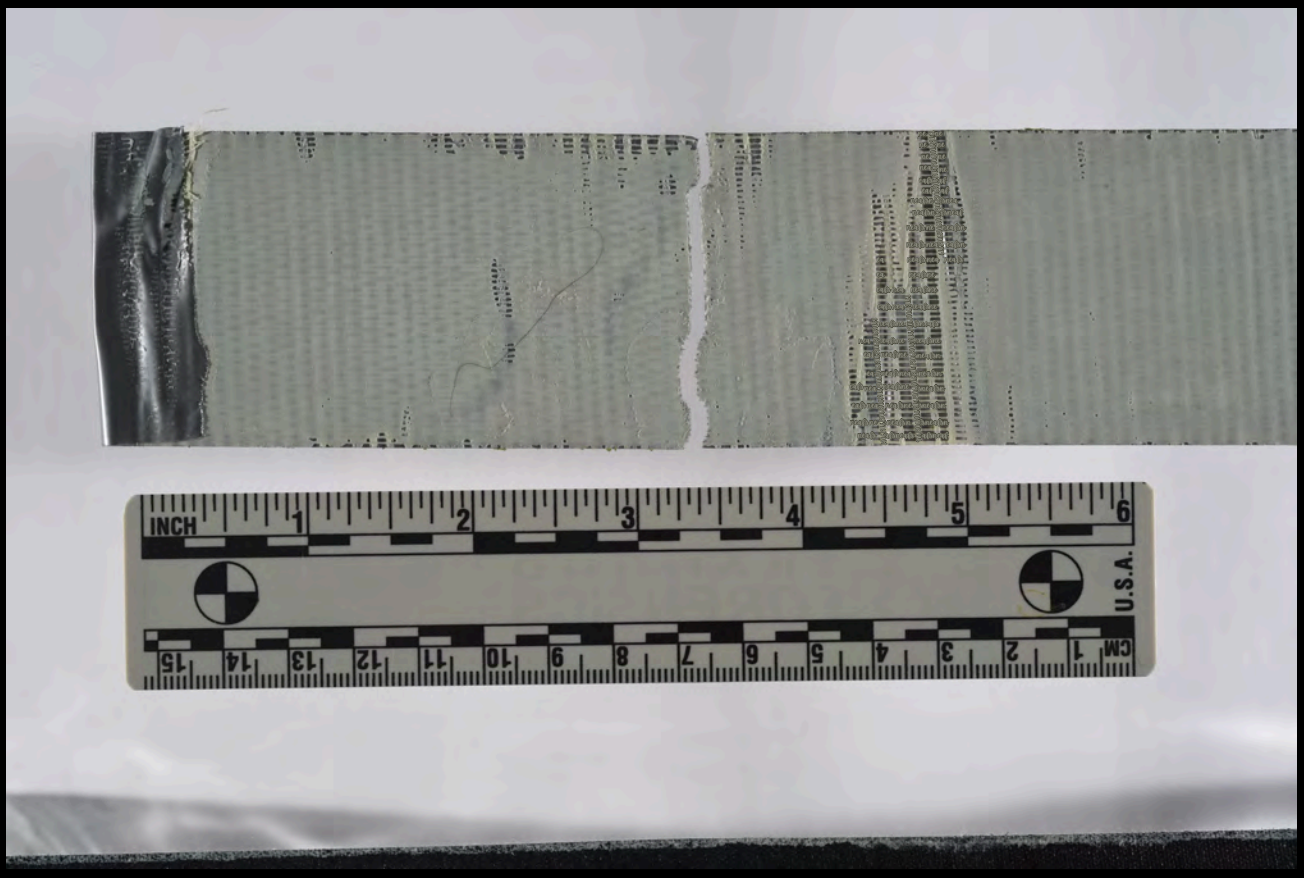
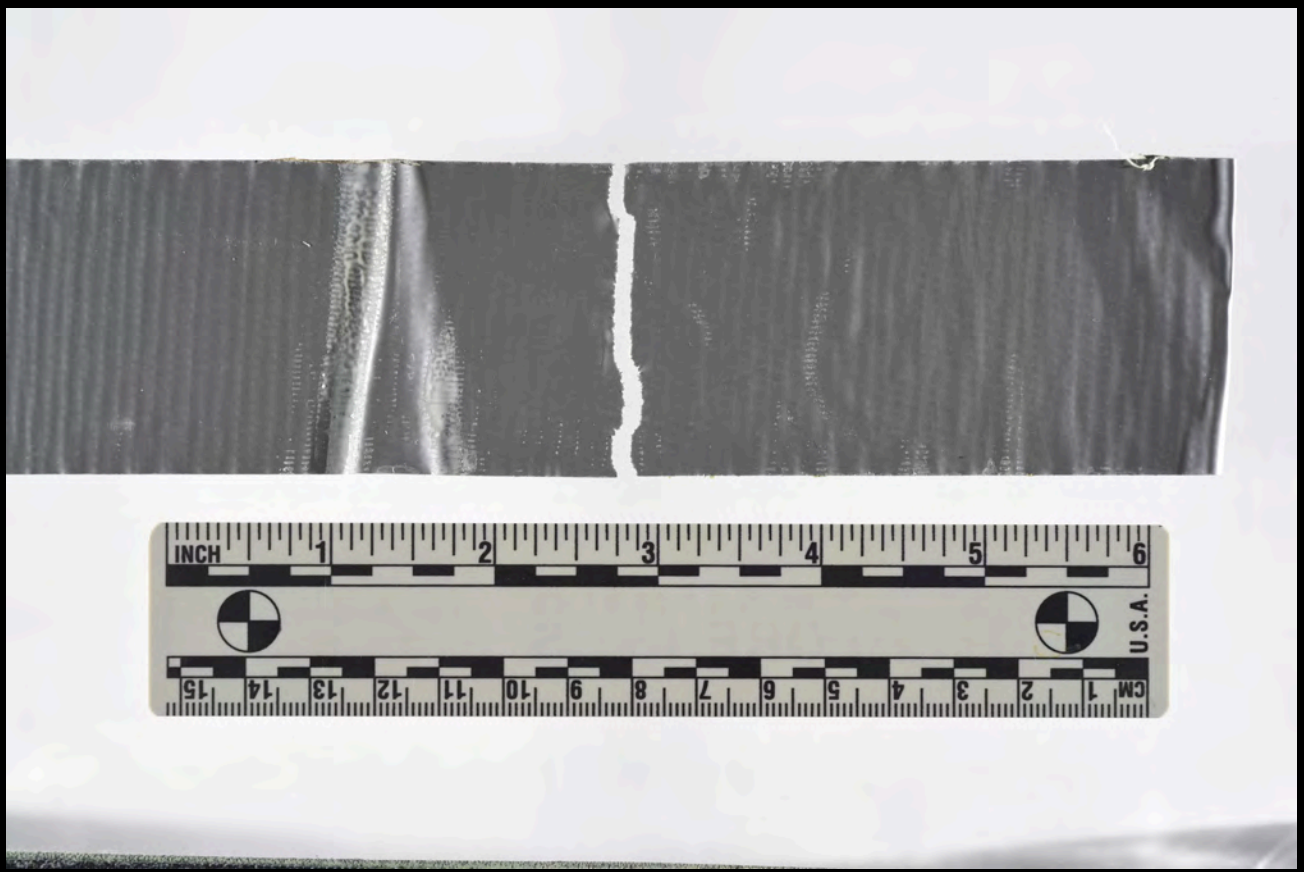
NEAFS Newsletter

Volume 49, Issue 4 Winter 2024





2024

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2024

Staff

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2024

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MEET THE 2024 BOD

Stephanie Minero– President

Nassau County Office of the Medical Examiner, Division of Forensic Service, Controlled Substance Analysis 2011-present
NYPD Police Laboratory, Controlled Substance Analysis 2008-2011
BS in Forensic Science- Long Island University/CW Post
MS in Biology- Long Island University/CW Post

Alanna Laureano– President-elect

Westchester County Department of Labs & Research, Division of Forensic Sciences Since 2007
Senior Forensic Scientist and DNA Technical Leader
BS in Molecular Biology and Biochemistry- University at Albany, SUNY
MS in Forensic Biology- University at Albany, SUNY

Matthew Marino - Treasurer

New Jersey State Police Office of Forensic Sciences, East Regional Laboratory Since 11/2011
Forensic Scientist 2 in the Drug Unit, Criminalistics Unit and Quality Assurance Unit
Forensic Technician, Westchester County, NY Forensic Laboratory from 07/2007 to 09/2011
BS in Natural Sciences with a concentration in Chemistry-St. Thomas Aquinas College

Amanda White - Secretary

New York State Police Crime Laboratory, FS III- Controlled Substance Analysis from 2019-Present
Westchester County Department of Labs & Research, Controlled Substance Analysis 2016-2019
NYPD Police Laboratory, Controlled Substance Analysis/Latent Print Development 2011-2016
MS Biomedical Forensic Science, Boston University
BS Biology & Anthropology, SUNY Oneonta

Anisha Paul M.S.F.S, D-ABFT-FT - Director

Vermont Forensic Laboratory, Department of Public Safety - Forensic Chemist Toxicology division since 2017
Adjunct professor at Champlain College since 2017
Masters of Science in Forensic Science from Arcadia University
Certified as a Diplomate by the ABFT in the field of Forensic Toxicology

Danielle Malone - Director

NYC Office of Chief Medical Examiner, Department of Forensic Biology from 2004- Present
BS Forensic Science with a concentration in Criminalistics, CUNY John Jay College of Criminal Justice

Sarah Roseman - Director

Nassau County Office of the Medical Examiner, Division of Forensic Services, Controlled Substance Analysis, 2015-present
BS in Biology, Binghamton University
MS in Forensics, Pace University

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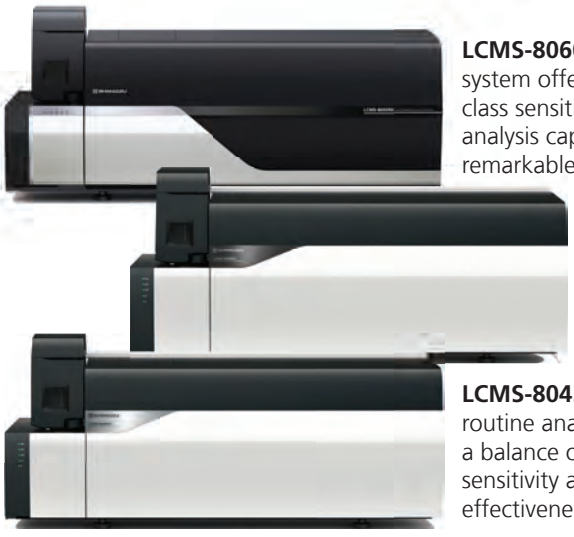

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STEPHANIE MINERO
PRESIDENT

Season's Greetings, NEAFS Members!

I hope you all enjoyed wonderful festivities filled with family, friends, and gratitude. It is no secret that New Year's Eve is my favorite holiday, and as it draws near it brings with it a desire to reflect on the past year and aspirations for the next. When I think about this past year as NEAFS President, I am filled with pride for what our organization has accomplished. We started this year with several goals including membership growth, benefits, retention, and collaboration. Thanks to the hard work of our board and staff, these goals were not only achieved but exceeded!

To assist with organizational growth, our membership drive is in full swing and will run until April 30th, 2025. As a reminder, sponsors will receive complimentary 2026 membership dues if they sponsor three applicants, and their name will be entered into a drawing to receive free annual meeting registration for every five applicants sponsored. Spreading the good word and convincing your colleagues to join NEAFS should be an easy task as we have added several member benefits over the past year. Based on usage metrics, we modified our Science Direct catalogue to include the most member-requested journals and will provide tokens to account for the journals we rescinded access to. If you are interested in using a token to purchase an article, please contact president@neafs.org for assistance. We expanded certification examination reimbursement to include the American Board of Forensic Toxicologists (ABFT) and the National Forensic Science Academy (NFSA) Certified Forensic Manager series. We resurrected NEAFS sponsored training and provided a free method validation and verification workshop through the American National Standards Institute, National Accreditation Board (ANAB) to twenty members and offered a significantly discounted rate to others. Lastly, we hosted an incredibly successful 50th Annual Meeting in Atlantic City, NJ stacked with workshops, presentations, and scientific sessions all while keeping the member registration cost at one of the most affordable rates in the region. The Outreach Event finally came together and received excellent feedback.

In an effort to retain our newly minted Student Members, the organization successfully voted on the acceptance of changes to the by laws which will allow them to maintain their membership as an associate member in their gap year between graduation and employment. We continue to make strides in forming a Student Committee and along with several other advantages that will be announced early next year, we aim to not only assist them in their forensic journey but to provide a continuous lifeline to the resources, connections, and training needed at this stage in their careers.

And finally – collaboration. 2024 was certainly an incredible year for our organization and we could not have done it alone. By joining forces with ANAB, NFSA, the American

Society of Crime Laboratory Directors (ASCLD), and the American Society of Trace Evidence Examiners (ASTEE), we were able to provide specific, relevant, and expert-level technical trainings for our members and the forensic community. My hope is that we continue to partner with organizations such as these to not only expand our repertoire, but to consistently be able to provide such outstanding opportunities to our members.

As this is my final newsletter address as President, I will sign off with some words that I previously shared at the Awards Luncheon at the Annual Meeting in October:

“Growing up, I was usually doing one of three things: eating, talking, or fighting. It took me several years to realize that they are three of the most important things you can do, and I will relate them to us as forensic scientists.

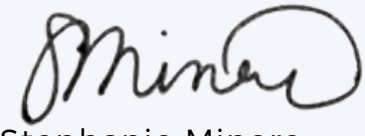
You eat when you are hungry, right? Stay hungry. Always keep an appetite to learn the next thing. To keep informed. To take that chance, study for that certification exam, enroll in that university program and better yourself. Go on the interview. Take that training class. Never let that fire in your stomach starve and extinguish. That is when we stop learning.

Talk. Talk to each other – your peers and colleagues. Learn from them. Give lectures, attend lectures, discuss common problems and collaborate to find solutions. Join committees. Silence can be deadly and we need to keep the conversation going to ensure we continue to progress in the right direction. We are a voice, a strong one at that, and we need to make ourselves heard.

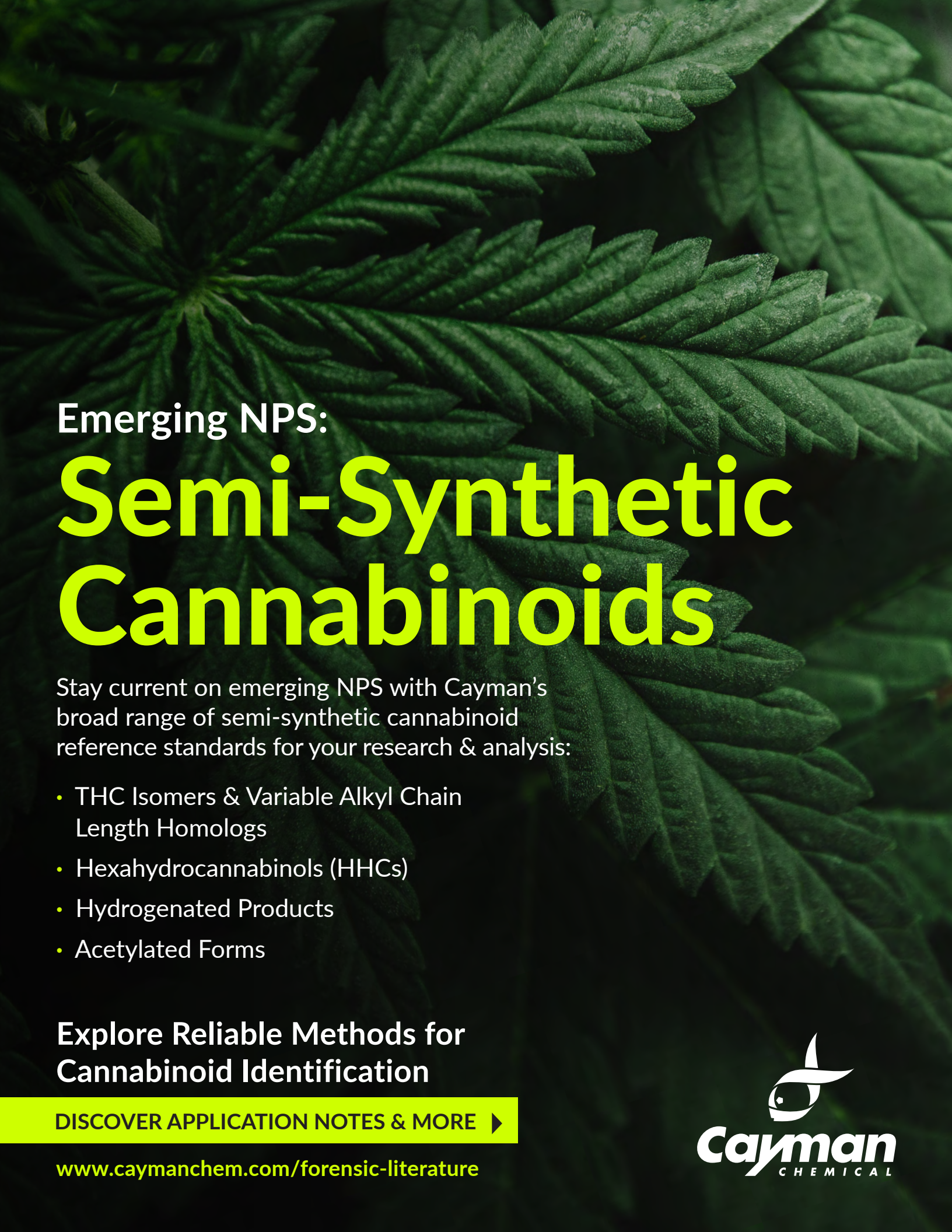
And last but not least, fight. Fight for what you believe in and for what is right. If you see something, say something. If you do not agree with a procedure or technique, offer to lead the project to change it. Sometimes the best change comes from conflict and it is a necessary evil to grow.”

In closing, I extend my most sincere thanks and gratitude to all of you. You are what makes this organization an institution in the forensic community, and I am constantly floored by the amount of dedication exhibited by everyone. Thank you for everything you all continue to do, and what you have done for me. For free. For nothing but the joy you get out of it. For life credits, as I say. I know I am leaving the organization in great hands, and I am excited to see the new heights that President-Elect Alanna Laureano will take you. NEAFS has been such an incredible journey for me and I have you all to thank for allowing me to serve in this capacity.

Cheers to a successful, happy, and healthy 2025!



Stephanie Minero
2024 NEAFS President



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NEAFS 51ST ANNUAL MEETING

Program Chair
Matthew Marino

OCTOBER 20 - 24, 2025

Lancaster Marriott at Penn Square, Lancaster, PA

WANT TO GET INVOLVED?

Email presidentelect@neafs.org

2025 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 23rd, 2024. No additional nominations were received. The terms of office are January 1 through December 31.

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Alanna Laureano

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Matthew Marino

Secretary
Amanda White

Treasurer
Anisha Paul

Directors
Danielle Malone
Sarah Roseman
Keri LaBelle

Past President
Stephanie Minero

Awards Chairperson
Eric Sorrentino

Certification Chairperson
Heather Harris

2025 NEAFS Board of Directors and Staff

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Keri LaBelle

Education Chairperson
Sandra Haddad

Ethics Chairperson
Adam Hall

Executive Secretary
Adrian Garcia Sega

Membership Chairperson
Colin Upton

Dues
Angelina Pollen

Social Media Coordinator/Merchandise Chairperson
Alyssa Berthiaume

Publications Chairperson
Brandi Clark

Registration Chairperson
Beth Saucier Goodspeed

Site Chairperson
Janine Kishbaugh

2025 NEAFS Board of Directors and Staff

Regional Associations Committee Representative
Beth Saucier Goodspeed

Outreach Coordinator
Scott Rubins

Volunteer Coordinator
Saman Saleem

Welcome

NEW MEMBERS

ALICE DANAS
A&E FIREARMS EXPERTS. INC.

ANDRA LEWIS
CEDAR CREST COLLEGE

CHRISTY GIRARD
GREENWICH POLICE

KAITLIN FARRELL
HUDSON COUNTY PROSECUTOR'S OFFICE

ELSBETH MURATA. OSHANE GAYLE. GABRIELLA RUOCCO
MASSACHUSETTS STATE POLICE CRIME LABORATORY

KATRINA KEENAN
NH DEPARTMENT OF SAFETY STATE POLICE FORENSIC LABORATORY

JOSHUA ROSENTHAL. JULIE YOUNG
NEW YORK CITY POLICE DEPARTMENT LABORATORY

MICHAEL MCCASLAND
NYC OCME

MAIKO SUZUKI FERRO
PA STATE POLICE WYOMING REGIONAL LABORATORY

GREGORY EMERSON
RHODE ISLAND DEPARTMENT OF HEALTH

QHAWE BHEMBE
RUTGERS UNIVERSITY-CAMDEN (DEPT OF CHEMISTRY)

Welcome

NEW MEMBERS

CHRISTINE HSIAO
STATE OF CONNECTICUT

LAURA COMBS
SUFFOLK COUNTY CRIME LABORATORY

NATALIE NOVOTNA. VERONICA POOLE
SYRACUSE UNIVERSITY

BENJAMIN WHEELER
UNIVERSITY OF NEW HAVEN

Welcome

BACK

OPRITSA TUDORIU
WESTCHESTER COUNTY FORENSIC LABORATORY

Upgraded

SARA ALVARO- TO REGULAR MEMBER
ALBANY COLLEGE OF PHARMACY AND HEALTH SCIENCES

JOANNE SGUEGLIA- TO EMERITUS MEMBER
INNOGENOMICS (RETIRED)

EARN

Free Dues

for 2026

MEMBERSHIP DRIVE

Why help others Become Members?

NEAFS offers forensic practitioners, students and other associates numerous education, networking, and financial opportunities, including trainings, meetings, and scholarships.

BENEFITS FOR SPONSORING MEMBERS

- Sponsor 3 members between September 2, 2024 and April 30, 2025 to earn free dues in 2026
- For every 5 members sponsored, receive one raffle ticket for free registration to a future meeting
  - unlimited number of tickets may be earned
  - Raffle to be held at the Annual Business Meeting in 2025

Good News! We streamlined the application process.
Applicants should visit https://www.neafs.org/membership

FOR MORE INFORMATION

email: Director1@neafs.org
Membership@neafs.org

Applications and your sponsor form must be received between 09/02/24 and 04/30/25

NEAFS 2024 ANNUAL MEETING

NEAFS 2024 ANNUAL MEETING

NEAFS 2024 ANNUAL MEETING

FORENSICS UNLEASHED
NEAFS OUTREACH

2024 ANNUAL MEETING

FORENSICS UNLEASHED
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2024 ANNUAL MEETING

MERITORIOUS SERVICE AWARD

AWARDED TO:

BRANDI CLARK

It is with great joy and gratitude that we submit this letter of nomination for Brandi Clark for the Northeastern Association of Forensic Scientists Meritorious Service Award. Brandi is an excellent example of what this award exemplifies.

Brandi has served NEAFS for many years. In the role of Publications Chair since 2014, Brandi has been responsible every quarter for creating an engaging newsletter that informs NEAFS members of current events, opportunities, and relevant news.

Brandi has also maintained the NEAFS website since 2017. As webmaster, Brandi streamlined the website and designed new ways to make it more accessible, useful, and aesthetically pleasing for NEAFS members, the Board of Directors, and Executive Staff. In 2018, Brandi implemented the switch to a new website host at the request of the Board of Directors. She was responsible for setting up all of the new accounts and migrating all important information. In 2019, she worked to make our website ADA compliant. In 2020, all forms were created in an electronic format on the website. A significant part of the improvement is the inclusion of electronic payments through PayPal. The new system beautifully integrates payment of member dues, registration, and payment of Annual Meeting registrations, and simplifies collection of important data.

The constant updating of forms and website information is a regular duty. Brandi monitors every single form submission on the website, which may sound simple, but consider that there were 20 different forms on the website as of 2023 and some with hundreds of submissions. Brandi does not just maintain the website, but she does it with style! She is always creating new interfaces, designs, and pop-ups announcing events of interest. Her sense of fun makes the website engaging and easy to use. Brandi quickly and cheerfully responds to requests for changes and updates to the website and is a delight to work with.

This year, Brandi converted most of the website contents and annual meeting logistics to a mobile app. A quote from a professional developer last January for this project was $10,000. True to form, Brandi did it using our current platform and completed the task within a few days.

Completing these daunting tasks is no small feat and Brandi came into the position with no prior experience. She has spent countless hours educating herself on web design and technical issues on her own time, and her curiosity drives her to continually learn new things. She is a "lunchtime warrior," doing work for NEAFS while sacrificing her precious one-hour lunch break from a stressful job that she does so well. While we all volunteer our time and talents to NEAFS, with respect to this particular type of work, IT professionals would have cost NEAFS tens of thousands of dollars to do what Brandi voluntarily does for NEAFS without monetary

MERITORIOUS SERVICE AWARD

AWARDED TO:

BRANDI CLARK

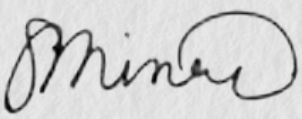
NEAFS without monetary compensation.

Brandi's incredible work does not end with NEAFS. In addition to being an active member of the NEAFS executive staff, Brandi serves justice through her work in the Westchester County Forensic Lab as a Forensic Science Specialist, where she was hired after graduating from the University of New Haven. Brandi started in the Westchester County Forensic Lab as a Forensic Biology lab technician on a grant. Her tenacity and capacity to accomplish was recognized early. After eight months, a position opened in the Trace Evidence section and she was hired in 2001. Brandi's expertise includes hairs and fibers, paints/polymers, impressions, gunshot residue, and physical matching. During her time in Westchester, Brandi completely redesigned the lab's propellant GSR procedures for distance determination and validated the lab's shoeprint database. She was the main expert in the lab for both these processes and was a primary analyst on the Crime Scene team. Brandi is training in primer GSR analysis on the scanning electron microscope and also works in the drug lab. She is cross-trained in Audio-Video analysis and enhancement of surveillance video footage and also works on cases in that section of the lab. Her diversity of expertise exemplifies her drive to work hard every day.

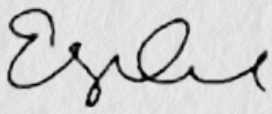
Brandi has worked on numerous research projects and is a contributing author on several papers that have been presented at NEAFS and AAFS. She is a co-author of the Chapter entitled, "Trace Evidence Recognition, Collection and Preservation" in the Handbook of Trace Evidence Analysis. Brandi is a charter member of the American Society of Trace Evidence Examiners (ASTEE) and is certified by the American Board of Criminalistics (ABC), for which she has served as a reviewer of recertification applications. As you can see, Brandi shares her talents with the field of Forensic Science both as a practitioner and through professional organizations.

Thank you for considering this nomination of our outstanding colleague, Brandi Clark, for the NEAFS Meritorious Service Award.

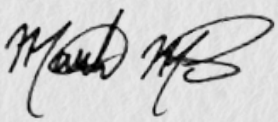
Sincerely,



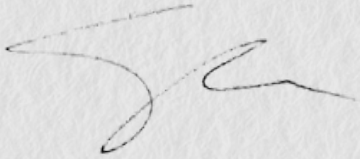
Stephanie Minero, NEAFS President



Elizabeth Duval, NEAFS Past President



Matt Marino, NEAFS Treasurer



Sandra Haddad, NEAFS Education Chair

NORTHEASTERN ASSOCIATION OFFORENSIC SCIENTISTS

MERITORIOUS SERVICE AWARD NOMINATION

THE NORTHEASTERN ASSOCIATION OF FORENSIC SCIENTISTS IS ACCEPTING NOMINATIONS FOR THE MERITORIOUS SERVICE AWARD.

ALL NOMINATIONS MUST BE RECEIVED BY SEPTEMBER 1ST. THE WINNER OF THE NEAFS MERITORIOUS SERVICE AWARD WILL BE ANNOUNCED DURING THE ANNUAL MEETING.

FOR MORE INFORMATION AND REQUIREMENTS VISIT THE NEAFS WEBSITE OR CLICK THE LINK BELOW.

HTTPS://WWW.NEAFS.ORG/MERITORIOUSSERVICEAWARD

HELP SUPPORT THE

Chin Cup Competition

- New Forensic Science Questions are Needed
- Help Keep the Competition Fresh
- With New and Up to Date Questions
- How Can You Help?
- Click & Submit Your Question & Answers
  Question with correct answer and 3 incorrect answers - please include source
- Please Feel Free to Submit More Than One

STUDENT PRESENTATION COMPETITION WINNERS

AWARDED TO:

SAMUEL FRIDAY

UNIVERSITY OF NEW HAVEN - GRADUATE

Investigating Odor Signatures of Electronic Devices

AWARD
2024

MICHAELA TAPIA

WEST VIRGINIA UNIVERSITY - UNDERGRADUATE

The Evaluation of Two Extraction Methods for the Quantitation of Delta-9- THC in Blood using LC/MS/MS

STUDENT POSTER COMPETITION WINNERS

AWARDED TO:

ANDREW ZEBLISKY

SYRACUSE UNIVERSITY - GRADUATE

Comparative Study of Different Charcoal Strips to Determine LOD and Resolution Using GC-MS

AWARD
2024

HANNAH CALISTA

HOFSTRA UNIVERSITY - UNDERGRADUATE

Nuclear DNA Analysis From Contact Lenses in Crime Scenes

GEORGE W NEIGHBOR AWARD

AWARDED TO:

ABIGAIL NOLL

UNDERGRADUATE STUDENT AT DUQUENSE UNIVERSITY

In the last decade, the drug epidemic has been on the rise with illicit substances such as fentanyl and oxycodone causing numerous deaths and injuries every year. However, drug abuse does not only affect those who are plagued by it. It causes emotional distress to loved ones and the surrounding community as well. While I have never known anyone in my personal life to have either died or been severely under the influence of drugs, I have seen the impact this behavior has had on relatives who were close to those struggling with substance abuse.

One memory that has always resonated with me takes place one day after elementary school. My younger sister and I were walking back home from the bus stop when we saw my mother sitting on the porch, waiting to greet us. However, as we grew closer, I could tell she had been crying and was trying to muster the courage to act unphased. I asked a simple question of how her day was, and she sadly replied that her childhood friend had passed away. I was not able to comprehend the severity of the situation until years later when it was revealed my mother's friend had died from an overdose caused by an unspecified drug. My mother had a rough upbringing which is reflected in her strong demeanor and resilient attitude. Therefore, it breaks my heart to know the grief she battled over the loss of someone who had helped her grow up all those years ago.

My mother is one of the main reasons why I chose to pursue forensic science in college. After witnessing the sadness from watching loved ones succumb to substance abuse, I knew I had to make a change. I knew I had to ease the burden for others any way I could. Throughout my time at Duquesne University, I have advanced my knowledge and skills so I could improve public safety and achieve greater social justice. I have undergone numerous biology and chemistry courses to build confidence in a laboratory setting and remain up to date on current procedures and scientific theories, all while maintaining the highest GPA in my grade level.

I have been fortunate enough to work on developing a new method for extracting drugs from human blood so these analytes can be identified and quantified through LC-QQQ-MS.

GEORGE W NEIGHBOR AWARD

AWARDED TO:

ABIGAIL NOLL

UNDERGRADUATE STUDENT AT DUQUENSE UNIVERSITY

I was able to develop my Master's research project around this concept with the help of faculty, and I was immediately passionate about working on it. The goal of the project is to develop a kit for law enforcement to use for sample collection when pulling over a driver suspected of being under the influence. This project resonated with me as I knew I would be able to prevent further drug-related injury, death, and grief from loved ones by contributing my time and knowledge to toxicology research.

While Duquesne University has supported my education, it has also enhanced my compassion and empathy for others. As a forensic scientist, we are reminded time and time again of how our work affects the community, especially when it is done unethically and leads to wrongful convictions. Professors at the university teach that victims should be viewed as humans and not as statistics in a journal article. I recognize the impact I have on others and choose to strive for professionalism in research and in my personal life. When I see someone suffering, I want to reassure and lift the emotional burden off them. With this financial grant from the George W. Neighbor, Jr. Scholarship, I hope to help victims receive justice, give closure to grieving families, and seek treatment for those still battling addiction by furthering my research in forensic toxicology and raising public awareness on the efforts being made in the field.

Abigail Noll

GEORGE W NEIGHBOR AWARD

AWARDED TO:

GRACE JOO

GRADUATE STUDENT AT PACE UNIVERSITY

My name is Grace Joo, and I have a Bachelor's Degree in Forensic Chemistry. I am currently pursuing a Master's Degree in Forensic Science at Pace University with an expected graduation date of May 2025. I am fervently working toward expanding my knowledge in forensic science and improving my performance as a forensic chemist.

I encountered my passion for forensic science later than most - during my senior year of my undergraduate program. Prior to finding my path, I had no long-term goals as a chemistry major and could not imagine a field in chemistry that I could thrive in. After taking a recommendation from a friend to take "Forensic Science I" with him, it seemed as if I found the answer to my dilemma. With a firm underpinning of chemistry and laboratory practices coupled with a newfound knowledge of the field of forensic science, I felt invincible coming into the Pace University Forensic Science Master's Program.

Little did I know that I had only scratched the surface. The forensic science field is evolving and dynamic. It turns out that I have so much left to learn. Through my Master's Program, I aspire to further hone my laboratory skills, buttress my foundation of chemistry concepts and how they apply to forensic science, and network with experienced, seasoned forensic scientists. I am hungry to become a better forensic scientist and be able to help others with my specialized knowledge. I believe that the George W. Neighbor Jr. Memorial Scholarship can provide the support I need for my mission to evolve into a stronger forensic scientist, benefitting myself, my peers, and the community.

Grace Joo

GEORGE W CHIN AWARD

AWARDED TO:

MELANIE TANIS

DUQUENSE UNIVERSITY

I have always loved puzzles growing up, taking the time to analyze possible solutions and use new investigative methods is part of why I chose forensic science as a career path. Forensic science allows me to apply my knowledge of the sciences to the proceedings of a criminal investigation and aid in the distribution of justice. It is important to me to be able to help others and provide a voice to victims. I have excelled in my laboratory experiences and classes and have begun my graduate research on the topic of bulletproof backpacks and their resistance against rifle rounds. This is with the goal to improve safety measures against school shootings. In addition to academics, I have also taken leadership positions in several clubs and professional fraternities on campus. I have had to communicate, both orally and in writing, with other students, faculty, and professionals, and have learned how to speak confidently to others and effectively communicate concerns and suggestions to my superiors. I am in two professional fraternities each with philanthropies aimed towards helping others and I see our support and fundraising as rewarding work. During one recent service event we compiled necessary goods and medicinal supplies for the homeless population in Downtown Pittsburgh to aid them during the winter months. I have also worked as a hospice volunteer by administering medications and providing company to a woman through the end of her life. My main goal in my career and my life in general is to help others, whether it's as small an act as teaching a friend a homework problem or larger acts such as volunteering, helping others is my passion. Recently I have been accepted into the Center for Forensic Science Research and Education forensic toxicology internship program for the summer of 2024 as well as an internship with the Philadelphia branch of the Bureau of Alcohol, Tobacco, Firearms and Explosives. I aim to use these internship opportunities to expand my knowledge of forensic science and see how different sides, the law and the lab, work together to deliver justice. With this scholarship I can continue to focus and excel in my studies to help others in need and share my knowledge.

Melanie Tanis

CAROL DE FOREST AWARD

AWARDED TO:

ALEXA FIGUEROA

UNIVERSITY AT ALBANY, SUNY

Development of Mass Spectral Approaches for Applications in Forensic Entomology and the Analysis of Underutilized Entomological Evidence

AWARD
2024

CAROL DE FOREST AWARD

AWARDED TO:

ALEXA FIGUEROA

UNIVERSITY AT ALBANY, SUNY

My name is Alexa Figueroa, and I am currently in my third year pursuing a Ph.D. in the Department of Chemistry at the University at Albany, SUNY, under the mentorship of Dr. Rabi A. Musah. Seeking the Carol de Forest Forensic Science Research Grant from the Northeastern Association of Forensic Scientists (NEAFS) is a natural step for me as it resonates with my dedication to pioneering forensic science through groundbreaking research. With a proven track record of academic excellence, substantial research experience, and a steadfast commitment to professional growth, I believe I am well-suited to be considered for this esteemed grant.

Before embarking on my graduate journey, I earned a Bachelor of Science degree with Cum Laude distinction in Chemistry from UAlbany in 2021, with a specialization in Forensics. During this period, I actively participated in tutoring initiatives aimed at enhancing STEM education for high school and undergraduate students. Additionally, I enrolled in the Chemistry department's B.S./M.S. program, which afforded me the opportunity to commence my graduate studies while still an undergraduate. Following graduation, I dedicated a summer to working at a startup contract pharmaceutical laboratory, where I contributed to refining and adapting methods for compound synthesis scaleup to meet client needs. Throughout my academic tenure, I have served as a teaching assistant for courses such as General Chemistry I & II and Organic Chemistry I & II. Furthermore, I excelled in relevant coursework, including Advanced Forensic Chemistry, and I have completed my graduate coursework with an overall GPA of 3.8.

Throughout my academic journey and while fulfilling my teaching duties, I have actively engaged in captivating research initiatives. Under the guidance of Dr. Musah, I've delved into various facets of forensic entomology, spanning stored-product and medico-legal domains. My initial exposure to stored-product research centered on employing direct analysis in real time – high-resolution mass spectrometry (DART-HRMS) to detect the presence of flour beetles in agricultural commodities, with implications for forensic investigations. Presently, my focus lies in the medico-legal realm, where I explore how small molecule fingerprints can aid in blow fly species identification using DART-HRMS and solid-phase microextraction (SPME)-facilitated gas chromatography mass

CAROL DE FOREST AWARD

AWARDED TO:

ALEXA FIGUEROA

UNIVERSITY AT ALBANY, SUNY

spectrometry (GC-MS) techniques. The outcomes of these investigations have been effectively communicated through poster and oral presentations at mainstream scientific gatherings, including the NEAFS Annual Meetings in 2022 and 2023, the NIJ National Research Conference in 2023, and the American Chemical Society (ACS) Northeastern Regional Meeting (NERM) in 2022 and 2023, among others. Notably, my poster presentation at the 2022 NEAFS meeting earned me the distinction of best poster presenter—an accomplishment that underscores the significance and impact of my research contributions.

The research outlined in this proposal seeks to highlight the efficacy of mass spectral techniques in analyzing entomological evidence within the realm of medico-legal forensic entomology. Specifically, our focus is on the rapid identification of carrion insect eggs, encompassing both viable and nonviable specimens, to enhance the precision of postmortem interval (PMI) determination. By developing these protocols, we aim to unlock vital information from typically underutilized evidence, thereby providing invaluable support to investigators. This collaborative project involves forensic entomologist Dr. Jennifer Rosati from the John Jay College of Criminal Justice. Together, our objective is to validate DART-HRMS and GC-MS as robust screening tools for species identification of blow fly eggs. I am currently working on drafting a publication that features some of the results of my work.

Since childhood, crime shows have captivated my interest, igniting a desire to become a crime scene investigator. By the time I reached high school, my fascination with Forensic Files was intense, and I excelled in my scientific coursework. This passion drove me to seek out a university where I could pursue a STEM degree with a focus on forensics. Now, as I embark on my Ph.D. journey in chemistry and delve into a forensic chemistry project, my enthusiasm for forensics has only deepened. I eagerly anticipate the opportunity to pursue a career in the field. In addition to my research pursuits, I serve as the Diversity, Equity, Inclusion, and Respect (DEIR) Chair for the Eastern New York local section of the American Chemical Society (ENYACS) and am an active member of the Younger Chemists Committee (YCC) for the section. Our mission is to promote diversity and inclusion within

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ALEXA FIGUEROA

UNIVERSITY AT ALBANY, SUNY

our local community, engaging individuals from diverse backgrounds in chemistry and raising awareness of science's role in our daily lives. Additionally, I am involved in STEM NOW (Nourishing Opportunities for Women), a support group fostering inclusion and community for women in STEM. Recently, I participated in a panel discussion at the 2023 NEAFS Meeting's Student Forum in Mystic, CT. Through these endeavors, I strive to cultivate a safe and equitable environment through professional development, networking, and advocacy, aiming to continue this work within the field of forensics.

I have demonstrated proficiency and meticulousness as a student, educator, and researcher within the realm of forensic chemistry. The mission of the Carol de Forest Forensic Science Research Grant seamlessly aligns with my dedication to advancing scientific applications in forensic science and chemistry. If awarded this grant, I anticipate that it would significantly propel my project forward, facilitating the successful culmination of my graduate research and the attainment of my career objectives. Additionally, the opportunity to attend and network at the forthcoming NEAFS conference holds promise in broadening my knowledge base and fostering invaluable connections with experts, thus shaping the trajectory of my research to better serve the forensics community. I am enthusiastic about the potential synergy between my research endeavors and career aspirations, in harmony with the objectives of the Carol de Forest research award, and I eagerly anticipate the opportunity to contribute to the NEAFS meetings and benefit from this esteemed recognition.

Thank you for considering my application.

Sincerely,

Alexa Figueroa

Development of Mass Spectral Approaches for Applications in Forensic Entomology and the Analysis of Underutilized Entomological Evidence

A. INTRODUCTION

Forensic entomology is a dynamic discipline that involves the use of insects to investigate and solve crimes through the utilization of the knowledge of their life cycles, behavior, and ecology. It continues to evolve in both its applications within criminalistics, and the techniques employed to establish connections between insect presence and criminal activity, including in cases of negligence. In numerous legal contexts, insects can offer crucial information that directly impacts legal proceedings and the determination of liability. Medico-legal forensic entomology is the utilization of "carrion insects" that colonize human and animal remains to estimate the time since death, commonly referred to as the postmortem interval (PMI). The decomposing remains serve as a feeding, breeding, oviposition (egg laying) medium, and refugia from extreme weather, predation, and resource competition.[1-3] It is the attraction of insects to remains as a consequence of the aforementioned factors that facilitates the determination of the PMI. This is because there exists a well-established correlation between the species of insects that feed on remains, and the different stages of corpse or carrion decomposition, with the earliest arrivers often being blow flies from the Calliphoridae family. Because these blow flies usually arrive within minutes of death, and because their species-specific life cycle timelines are well-known, it is possible to “back calculate” the approximate time of death by assessing when the eggs associated with the retrieved entomological evidence were laid. Since it is presumed that the eggs were laid on the remains shortly after death occurred, determination of when the eggs were laid can serve to approximate when death occurred. This back-calculation can only be utilized when the species is known, but species identity can be difficult to assess because species of blow flies are visually similar across the juvenile life stage forms (i.e., eggs, larvae, and pupae). Additionally, each species within a developmental life stage spends varying amounts of time in that stage, depending on factors such as temperature and humidity. Traditional identification methods require time-consuming rearing of immature forms to adulthood, hindering efficient species identification, especially in crime labs lacking entomological expertise and specialized facilities. This results in the underutilization of such informative evidence. Therefore, there's a pressing need for rapid and efficient species identification methods, particularly for the immature forms of evidence commonly collected. The development of such an approach for species identification of entomological evidence is a major focus of my research.

It is hypothesized here that blow flies exhibit species-specific metabolome signatures, and that a database of these can be used as a screening tool against which the metabolome signatures of unknown carrion insect samples can be screened, in order to rapidly determine the species identity for forensic purposes. Chemically-based approaches for insect detection and identification that leverage species-specific metabolome profiles for rapid species identification across multiple life stages are proposed here. Mass spectral analyses, such as Direct Analysis in Real Time—High Resolution Mass Spectrometry (DART-HRMS), and solid-phase microextraction (SPME)-facilitated Gas Chromatography Mass Spectrometry (GC-MS), are suggested as methods for rapid analysis of entomological evidence, irrespective of collection method. DART-HRMS enables analysis of *nonviable* evidence stored in 70% aqueous ethanol, which is the current method of entomological sample storage in crime labs. The goal of utilizing this technique is to expand the species currently in our database, enabling the rapid identification of more carrion blow flies. The second approach, which utilizes SPME/GC-MS will facilitate rapid analysis of *viable* samples. This technique serves to achieve our goal of investigating the correlation between the profiles of chemicals emitted by eggs, and the age of the eggs, as a function of species identity. The results of this work will pave the way for the creation of a database of the chemical signatures associated with the various life stages of each species, which

can then serve as a screening tool against which the metabolome profiles of sample unknowns can be compared to rapidly determine species identity. This multifaceted approach would enable crime labs to extract information from entomological evidence that often remains unutilized, thereby enhancing its evidentiary value, and facilitating more rapid PMI estimation and expediting case prosecution. The hypothesis will be explored through pursuit of the following specific aims:

Specific Aim I: Determination of the species-specific chemical signatures of the eggs of forensically relevant blow fly populations endemic to the United States.

Specific Aim II: Determination of the insect derived chemical cues of the eggs of forensically relevant blow fly populations endemic to the United States.

Specific Aim III: Development of statistical analysis approaches for the processing of the species-specific insect chemical signatures to enable development of a species prediction model.

B. BACKGROUND AND SIGNIFICANCE OF RESEARCH PROPOSED

Blow flies utilize corpses for mating, as an oviposition medium, and as a source of nourishment for their larvae. They have evolved to detect remains using semiochemical cues from distances of up to 2 miles. Upon reaching the cadaver, they rely on a combination of chemical, tactile, and visual cues to assess if it is suitable for oviposition. Consequently, extensive research has been dedicated to identifying the specific chemical cues responsible for this attraction.

As previously noted, to successfully accomplish PMI determination using entomological evidence, the identity of the species must be known. This can be difficult because in many instances, species within a given life stage, such as the eggs, are visually very similar. For example, Figure 1 features the eggs of four different Calliphoridae spp. that are visually very similar, and whose species identities are not apparent from visual examination. For this reason, retrieved eggs are woefully underutilized as a form of entomological evidence, even though they have the potential to enable more rapid PMI estimation. To better appreciate the necessity for the development of approaches for species identification of eggs, it is helpful to consider the current methods by which this is accomplished. Generally, without staining or scanning electron microscopy, the microscopic features of fly eggs are not distinctive enough to enable unaided visual differentiation between species.[4-6] However, if the collected fly eggs are viable, they can be reared to adulthood so that species identity can be determined from the morphological features of the adult, and the PMI can be estimated from the species identity of the fly and the time required for the eggs to hatch.[7] Scanning electron microscopy (SEM) has been employed to distinguish the immature life stages of *Calliphora vicina* and *Synthesiomya nudiseta*.[8] While the eggs used displayed clear differences in the plastron characteristics and were easily differentiated, this can mainly be attributed to the fact that the eggs studied belonged to two different families. The authors noted that SEM cannot distinguish between all species of fly eggs, as eggs belonging to closely related species within a genus or even within a family are often too visually similar. Tarone et al.[9] reported that egg age estimation can be made from the expression of *bcd*, *sll*, and *cs* genes that are present. All three are developmentally regulated, changing as the eggs mature. Using the combination of all three genes yielded predictions as close as within two hours of the actual age. However, it was noted that while this technique is

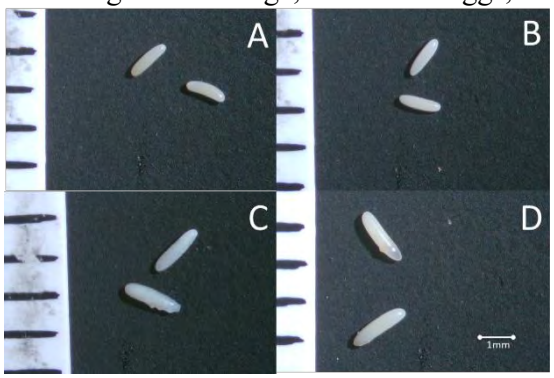

Figure 1. Different species of forensically relevant blow fly eggs: (A) *L. sericata*; (B) *P. regina*; (C) *L. coeruleiviridis*; (D) *C. vicina*.

feasible in most labs utilizing DNA analysis, the legal acceptance of such data is open to question. Since the study was conducted on freshly collected eggs, the suitability of eggs preserved in various mediums for species ID has not been explored, dramatically limiting the viability of this approach.

In prior research, it was demonstrated that species identification of blow flies (Order: Diptera) is achievable based on chemical fingerprint signatures acquired by analysis of aqueous ethanol suspensions of insects using DART-HRMS.[10-11] Our lab was also the first to show that the headspace volatiles profiles of two species of blow fly eggs *(Lucilia sericata* and *Phormia regina*) could be collected and concentrated using SPME fibers, which could then be subsequently analyzed via GC-MS. A range of compound classes, including hydrocarbons such as octane, tetradecane, and tridecane were detected in the headspace profiles of the eggs of *L. sericata* and *P. regina*.[12] Using this technique, we aim to explore the possibility that the profiles of compounds emitted from blow fly eggs changes over the course of their maturation. If these profiles can be determined as a function of time and environmental conditions (e.g., temperature, humidity), it may be possible to correlate the detection of a particular chemical or group of chemicals produced by the eggs, to their age. This would enable more precise PMI determination through the detection of volatile compounds emitted from the eggs.

C. EXPERIMENTAL DESIGN

Specific Aim I: *DART-HRMS*—In order to create a database that investigators can use, we need to significantly expand the number of species represented. To date, we have analyzed 13 of the most forensically relevant species, such as *L. sericata, Calliphora vicina, Ca. vomitoria, P. regina*, and more, with some species being collected from multiple regions around the United States. The analysis approach is as follows: Approximately 50-100 eggs of each species will be placed in a vial containing 3 mL of 70% aqueous ethanol. For each of the prepared samples, three replicates of DART-HRMS data will be collected and averaged. To ensure a comprehensive data set, a minimum of fifty individual samples per species will be tested. Data processing techniques such as calibrations, background subtractions, and peak centroiding using TSSPro3 software (Schrader Analytical Laboratories, Detroit, MI) will be utilized in order to apply multivariate statistical analysis methods to the mass spectral data.

Specific Aim II: *SPME/GC-MS*—The headspace volatiles of various viable (i.e., living) samples of forensically relevant necrophagous insect egg species common to different regions across North America will be collected via SPME fibers and subsequently analyzed by GC-MS, as a function of maturation time. The headspace volatiles will enable the detection of compounds that may be useful in the species identification of juvenile forms. The eggs laid by the reared adult flies will be collected on petri dishes, carefully transferred to scintillation vials, and covered with Kimwipes secured using rubber bands. The headspace volatiles emitted by the eggs as a function of time will be concentrated onto SPME fibers for subsequent analysis by GC-MS. Compound identification will be accomplished by GC retention time (RT) matching, NIST database MS fragmentation pattern matching, and comparisons with the RTs and MS fragmentation patterns with those of authentic standards.

Specific Aim III: *Multivariate Statistical Analysis*— To differentiate between insect metabolome profiles, several statistical analysis prediction models will be applied to the mass spectral data collected, as demonstrated in Figure 2. The Mass Mountaineer software suite of multivariate statistical analysis algorithms will be used as a tool for assessing potential species classification and identification models. Algorithms to be investigated include principal component analysis (PCA), linear discriminant analysis (LDA), and kernel discriminant analysis (KDA) among several others as necessary. Advanced multivariate approaches will be applied as needed using Python 3.10.5 and R 4.2.3 software, and may include artificial neural networks among other methods. We plan to implement an aggregated hierarchical conformal predictor, an advanced statistical feature utilized in a previous publication, that

prevents the model from attempting to assign species identities to samples not represented in the model.[11]The creation of a database of species-specific profiles will also enable the rapid identification of species that are present within a mixture, as shown previously.[13]

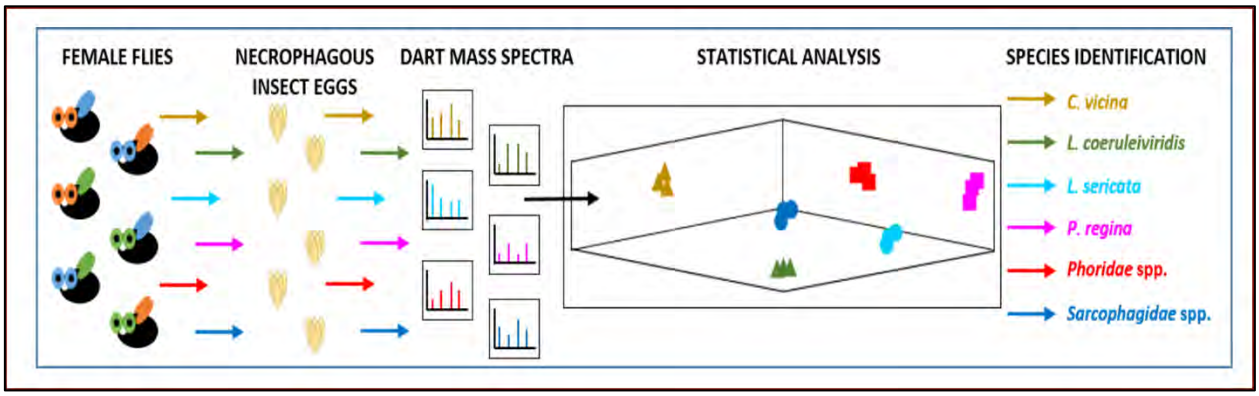

Figure 2. Illustration of experimental design for subjecting DART-HRMS-derived species-specific chemical profiles to chemometric processing to reveal species identity (adapted from reference 10).

D. PRELIMINARY RESULTS

A major goal is to expand the number of blow fly species represented in our prediction model database. To initiate this investigation, access to authenticated specimens is required, and this process has begun by using specimens of several forensically relevant insect species obtained from the collections of Dr. Jennifer Rosati (John Jay College of Criminal Justice). As an initial measure to assess whether the aqueous ethanol suspensions of blow flies would exhibit species-specific chemical profiles for the purpose of species identification, the suspensions were analyzed by mass spectrometry and the chemical signatures generated were monitored. The DART mass spectral data shown were then used to generate a KDA model (Figure 3). This model was built using a total of 240 samples of the six indicated species of blow fly eggs. When the data were subjected to KDA, the prediction accuracy was computed to be 87.35% (shown in Figure 3). There were 200 DART-HRMS-detected masses used by the KDA model to differentiate between the species.

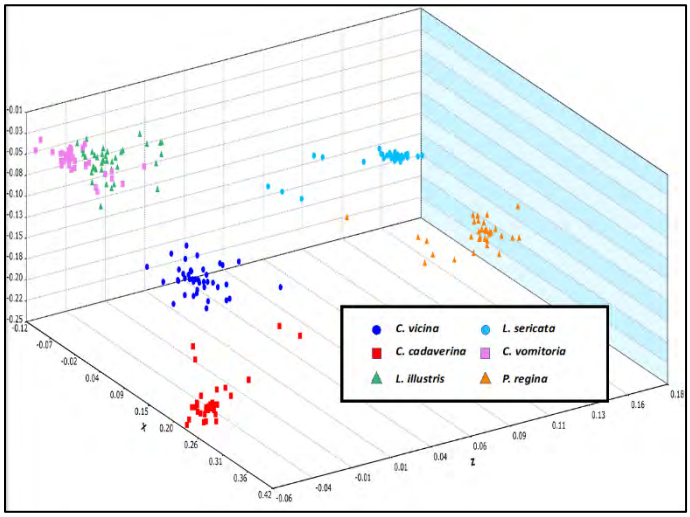

Figure 3. KDA model of the six Calliphoridae species of blow flies illustrating separation based on species identity.

For viable (i.e., living) samples that are collected, the SPME/GC-MS coupled approach has also been shown to furnish species-specific, as well as *age* specific chemical profiles. Focusing on *L. sericata* eggs, since they are typically the first colonizers of remains (and other species do not arrive until after these eggs have been laid), a time course study conducted over a 15-hour period resulted in the detection of over 180 compounds. One interesting finding was the observation of several trends in compound emissions. Certain molecules were present throughout, some were detected for several hours before disappearing altogether, and others varied rhythmically. These trends are presented in the bar charts in Figures 5-7 which display the compound intensities on the y-axis, the time in hours on the x-axis, and the replicate

number on the z-axis. Figure 4 shows the profiles of compounds that were present throughout. Figure 5 shows examples of molecules that exhibited a decreasing emissions trend, and Figure 6 illustrates those whose emissions exhibited a rhythmic trend. Compounds whose names are highlighted in red have been previously reported to be emitted by *L. sericata* eggs.[14]

The observed trends may indicate that the volatiles profiles of the eggs of the analyzed species vary as a function of maturity. The findings hint at the possibility that the age of the eggs can be inferred from the volatiles emitted at the time they are collected, and this, along with other information such as species identity and environmental conditions, etc., could facilitate more accurate assessment of PMI.

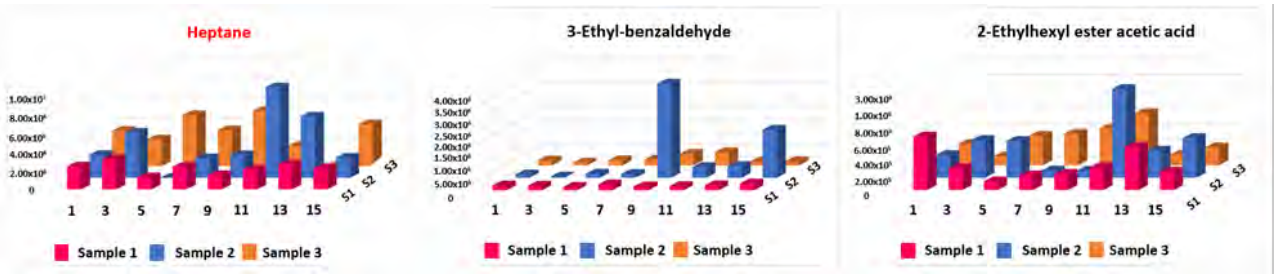

Figure 4. Molecules emitted by *L. sericata* eggs, and which remained present throughout the entire 15-hour time frame of the monitoring, albeit at varying levels.

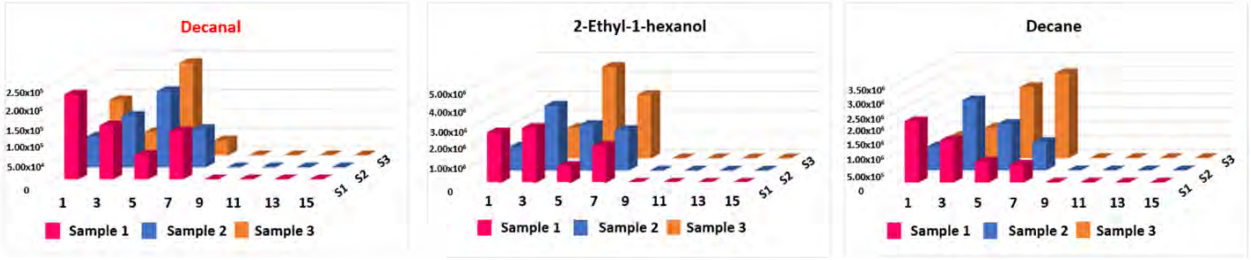

Figure 5. Molecules emitted by *L. sericata* eggs, and which disappeared after 7 hours.

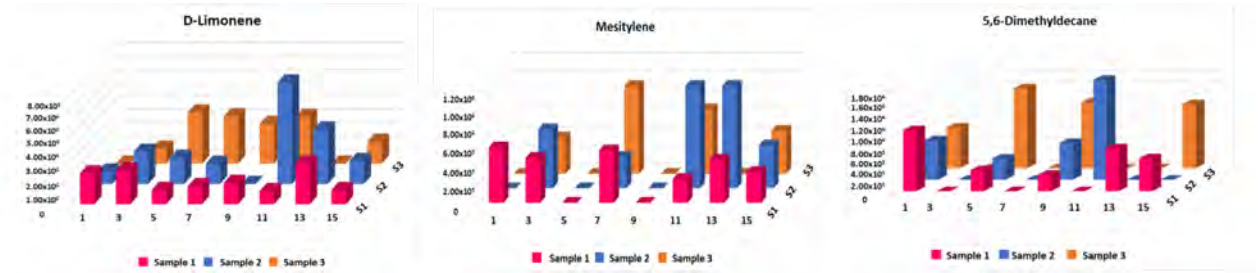

Figure 6. Molecules emitted rhythmically by *L. sericata* eggs.

E. EXPECTED RESULTS AND CONTRIBUTION TO FORENSIC SCIENCE

It is anticipated that the results of this project will have a significant impact in the field of medico-legal entomology. Utilization of DART-HRMS has become increasingly popular in recent years, with some crime labs using this technique for analysis of various materials as part of the forensic science workflow. The use of DART-HRMS for nonviable evidence stored in ethanol could be extremely impactful, especially in cases where the specimens are simply stored and not utilized to their full potential. *The use of this SPME/GC-MS protocol will be extremely impactful in the field for specimens that are still viable because this will eliminate the need for rearing the immature life stages to adulthood*.

F. BUDGET

To further advance the development of these mass spectral protocols for species determination and age determination of entomological evidence for PMI estimation, funds are needed to secure supplies for the storage and maintenance of specimens, such as vials and ethanol. Also, nitrogen and helium gases are required for instrumental analysis. The results of these investigations will be disseminated at the 2025 NEAFS Annual Meeting. Therefore, funds are also requested to defray the cost of attendance.

Item	Average Cost per Item	Number of Units	Total Cost
Helium	$387	3	$1,161.00
Nitrogen	$16	4	$64.00
1-dram vials, pack of 144	$125	7	$875.00
General consumables (labelling tape, sharpies, gloves, fly maintenance supplies, etc.)	$150	1	$150.00
Travel to NEAFS Annual Meeting 202	$250	1	$250.00
Amount Requested from NEAFS			$2,500.00

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CAROL DE FOREST AWARD

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RILEY ALPUCHE

UNIVERSITY AT ALBANY, SUNY

Detection and Identification of Skin Cells via Raman Spectroscopy for Forensic Purposes

My name is Riley Alpuché, and I am a second year PhD student at the University at Albany, SUNY. I am currently pursuing my degree in analytical chemistry, with a focus on its application to forensic science. Fun fact about me: my mom never let me watch SpongeBob as a child, but fully let me watch CSI with her, which is probably why I'm on the path I am now. I believe that I should be chosen to receive this grant because I am dedicated to the work I do in this field. I also plan to stay in the Northeast after I complete my graduate degree. This grant would help my work by providing funding which would accelerate the completion thereof and help to provide novel information to the forensic science community. I have made significant milestone successes in my brief graduate career, in the form of awards, pending publications, and presentation, which show that I am a dedicated researcher.

I put significant effort into my work, which ensures that I will be successful in my research. As a team member, I strive to be devoted and hardworking, leading where needed. My ultimate goal as a member of the Lednev lab is to not only complete my own research projects, but also help those around me learn and grow as I can. Within my lab, I have taken on several leadership roles, including the maintenance and training of our Horiba Raman XploRA Plus instrumentation. While working towards my bachelor's degree in chemistry at Augusta University, I became involved in research, though not for the first time. My first time becoming involved in research, I was completing my Senior Capstone Project, as a senior in high school. During this project, my interest in forensic biology led me to an investigation of the presence of an alu insertion of the DNA of myself and my parents, performing the necessary extractions and procedures under the careful watch of Dr. Angie Spencer. As an undergraduate researcher, I worked under Dr. Brian Agee, to attempt the extraction of benzylamine from the roots of the Moringa oleifera tree, using less hazardous chemicals than the already established chloroform. During my time as a researcher, I learned the importance of time management, obtained invaluable experience with a multitude of instrumentation, and worked to improve my writing skills.

While finishing my bachelor's, I originally anticipated pursuing a master's degree; however,

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both my research advisor and my faculty advisor advised that I should consider pursuing a PhD, encouraging me to at least apply, with the worst possible outcome being that the schools say no. Luckily for me, the University at Albany, SUNY said yes, and I was able to pursue analytical chemistry at the highest graduate level, where I am now a member of Dr. Igor Lednev's research laboratory. Here, I am able to work on many forensic science projects. Much of my work so far has included determination of limit of detection for our universal body fluid identification model, which has been developed previously by our lab. However, I also want to expand my work to spectroscopic analysis of skin cells, as I feel this area has a significant amount of untapped potential for forensic investigators. Overall, I have presented several posters at both national and local conferences, as well as having been awarded a travel grant in order to present.

Additionally, I am an active member of several professional societies. For the American Chemical Society, I have served as both secretary and vice-president for the student chapter of the Savannah Regional Chapter, as an undergraduate, doing significant work towards the awards won by the chapter. For the Society for Applied Spectroscopy, I have served as both treasurer and president-elect for the New York Capital Region Student Chapter. In these roles, I helped to organize the annual symposium held by this chapter. I am also a member of the Coblentz society, becoming more involved as time progresses, helping to advertise the Speed Mentoring events.

I have always been passionate about my work as a forensic scientist. After completion of my PhD, I plan to work in either a governmental research lab or at a forensic investigator in a state lab here in the Northeast. Afterwards, I would love to pursue teaching and academic research once again, allowing me to continue to advance the field of forensic science. Funding from this grant would also allow me to attend NEAFS, helping me to stay up to date on the latest research in the field, and expand my network of fellow forensic scientists and forensic researchers.

Detection and Identification of Skin Cells via Raman Spectroscopy for Forensic Purposes

Riley Alpuché, University at Albany, State University of New York

I. Introduction, Background, and Significance of Research

a. Introduction

Skin cells can be found everywhere a person has made contact, with the individual's shedder status influencing how much is left behind; heavy shedders leave the greatest trace behind, and light shedders leave the least[1]. Due to this, the skin cells found at a crime scene may not be related to a crime - they could be from the innocent transfer between individuals who already know each other[2]. Therefore, a way to distinguish between the bodily origin of a skin cell becomes necessary, as those found originating from genitalia would prove effective in investigating sexual assault cases.

There is currently no court accepted method for skin cells identification, creating a desire for a technique that can withstand the large load of evidence forensic examiners work through, both in lab and on-site. Due to the ability of Raman spectroscopy to perform rapid, nondestructive analysis of samples, paired with chemometric analysis, there is a high potential for determining the source of skin cells. However, because research is conducted in controlled conditions, effects of common environmental factors influencing skin cells must also be investigated, as skin cells from crime scenes are unlikely to be found in pristine condition.

b. Relevant Literature Review

Much of the work done using both ATR-FTIR and Raman spectroscopy on skin cells is meant for the differentiation between healthy skin cells and those affected by cancer[3,4]. Raman has also been used to investigate changes in skin as one ages[5], drug quantification via skin analysis[6], and differentiating skin layers[7]. There have been many articles identifying the important spectral bands found in skin[3,5,8], and one study also focused on the elimination of background noise in the spectra of skin cells[9]. In 2016, Muro et al. showed that Raman spectroscopy can be used to identify a body fluid found at a crime scene[10]. Therefore, an in-depth study of the Raman spectra of differing sources of skin cells, as well as the effect of environmental factors, should be conducted to develop a more cohesive methodology of identification and analysis.

c. Relevance of Proposed Study

The final goal is to create a method that is viable in the court of law, according to the Daubert admissibility standard. Developing techniques must meet the five standards in its creation: a testable method, subjection to peer review and publication, a known error rate or capacity thereof, maintains standards/controls, and accepted methodology by the scientific community[11]. The results from this study will be a step toward meeting all requirements for the Daubert admissibility standard.

When looking at the whole of forensic crime scene investigations, one may wonder how identifying skin cells would ultimately add to the big picture. First, identifying the origin site of skin cells deposits can be valuable information for investigations regarding sexual assault, as it can corroborate a victim's claim when there are penile, vaginal, or digital skin cells present where they are not supposed to be. This can be done on both porous and nonporous surfaces at the crime scene, as well as on the extracts from swabs collected with the intent for DNA analysis. Conducting the cell-type identification using our proposed nondestructive and quick test just before the DNA

analysis will not disrupt the entire process while adding a valuable information. Skin cells include both nuclear and mitochondrial DNA, which could be used to create important genetic profiles. Knowing where these samples are leads to proper collection of these trace samples, which can then be used for DNA analysis which can ultimately lead to the capture of a perpetrator.

II. Experimental Procedure

a. Objective 1: Expansion of universal method for identification of body fluids to skin cells.

A method for determining the identity of a body fluid via Raman spectroscopy has already been developed within the Lednev lab by Muro *et al*[10]. The goal here is to determine whether skin cells are identifiable by this model. With approval from SUNY Albany's Institutional Review Board, skin cells will be collected directly from donors. A minimum of 30 healthy adult donors (over 18 years of age) will be tested, with donors of both sexes. The skin cells will be collected first by a sterile swab wet with water, followed by a dry swab. Samples collected with the dry swab will be extracted by first removing the cotton from the handle, and submerging in 400 µl of ultra-pure water, in a 2mL centrifuge tube. This tube will be shaken at 900 rpm for 10 minutes, after which the tip will be removed from the tube and placed in a DNA IQ Spin Basket, which itself is held in a 2mL centrifuge tube, and centrifuged for ten minutes at maximum speed, to also allow for the skin cells to pellet. The liquid will be decanted, and the pellet resuspended in 30 µl ultra-pure water. 10 µl of this sample will be deposited onto a microscope slide covered in aluminum foil and allowed to dry overnight. The Raman spectra will be collected using a Horiba XploRA Plus Raman Microscope. Samples will be irradiated with a 785-nm laser at 100% power, with a 100x objective lens. Five spectra will be collected from each sample, using automatic mapping, over a range of 250 to 1800 cm-1, with 30-second accumulations for each collection point. The spectra will be imported into MATLAB with the PLS Toolbox program for preprocessing, consisting of a minimum baseline correction and normalization by total area. These spectra will then be added into the pre-existing body fluid model developed by Muro *et al*. After addition, the model will be tested using both internal cross-validation as well as external validation datasets.

b. Objective 2: Characterization of epithelial, buccal, and genital cells.

i. *2.1 Characterize differences between epithelial, mouth, vaginal, and penile cell Raman spectra*

As with objective 1, samples 10 µl of collected sample will be deposited on a microscope slide covered in aluminum foil. Collection of epithelial samples will follow the procedure outlined above. Samples collected from the mouth will have the participant not eat 30 minutes before collection. A cotton swab will be inserted into the mouth by the PI and passed over the cheek and gums of the donor. This swab will then be passed over an aluminum foil covered microscope slide and allowed to dry covered overnight. Samples collected from the vaginal canal will be collected from donors who have abstained from intercourse for at minimum three days and has rinsed between the folds of the vulva. The subject will then collect a swab from the inner labia, passing over the skin for at least 30 seconds, and replace into a protective transport tube. This procedure will be repeated within the vaginal canal. The samples will be removed from the cotton swab and deposited on the slide as previously described. Samples collected from the penis will be collected from a subject who has abstained from intercourse for at minimum three days and has rinsed their genitals with water before collection. The subject will then pass the sterile cotton swab across the shaft of the penis, being in contact with the skin for at least 30, replacing the swab into a protective

transport tube. This process will be repeated with the head of the penis; uncircumcised subjects will be asked to retract their foreskin before collection of cells from the head of the penis. Sample preparation of slides will be conducted as previously described. A minimum of 30 healthy adult donors (over the age of 18) will be tested for each section of the body, with a split between male and female subjects. Samples will be run as previously described in objective 1.

ii. *2.2 Develop a statistical model for skin cell type determination from collected Raman spectra*

The spectra collected from sub-objective 2.1 will be imported into MATLAB with the PLS Toolbox program for preprocessing as previously described. Partial least squares regression (PLSR) and principal component regression (PCR) analyses will be used for prediction of skin cell origin. Models will be built based on a calibration dataset, and a randomized validation set of three donors for each body section will be set aside. After model construction, the models will be tested using both an internal cross-validation, as well as external validation from the data set aside.

iii. *2.3 Determine effect of substrate collection for epithelial and buccal samples*

The sample collection procedure is described for the controls of both epithelial and buccal samples in objective 1 and sub-objective 2.1, respectively. The substrate samples will be collected from at minimum ten healthy adult donors (over the age of 18), five male and five female. The epithelial sample collection from a non-porous surface will have the subject wash their hands thoroughly, and have the PI thoroughly wipe down the cell phone of the subject with an alcohol wipe. The subject will then handle their phone as normal for one minute. The sample will then be swabbed using the double swab technique, extraction, and deposition as previously described. The epithelial sample collection from a porous surface will have the subject wash their hands thoroughly, and then handle a small piece of fabric for one minute. One-inch squares will then be cut from the substrate and will follow the procedure as outlined previously for cotton swabs. The buccal substrate sample will be collected from a subject who has not eaten for at least 30 minutes. They will then simulate drinking from a sterilized water bottle for at least 30 seconds. Collection from the area of interest will follow as previously described, as will the collection of Raman spectra. The spectra will be submitted into the finished model from objective 2.2 for identification, to determine possible effect of the substrate in sample identification.

III. Expected and Preliminary Results

Preliminary work conducted has focused on optimizing the collection of skin cells from the hand, as well as the collection of Raman spectra. Further collection of samples will be preprocessed, followed by the application of spectra to the universal body fluid identification model. It is not expected that skin cells will be consistently identified as a single body fluid according to the model; however, due to the presence of skin cells in body fluids such as sweat, saliva, and vaginal fluid, it is possible there will be some misclassifications as these body fluids. With skin cells not being classified as body fluids, they will be added to the universal identification model, and internal cross-validation, and external validation will be performed.

While skin should have a general makeup over the entire body, the different areas of collection have different functions, with the mouth and vaginal canal including mucus membranes, and the hands having thicker, calloused skin due to constant friction. Because of this, it is expected that

there will be a variation between the skin cell collection sites, which will allow for the creation of a statistical model that can accurately differentiate between the cell origin sites.

For the collection of samples from a substrate that might be found at a crime scene, it is expected that less cells will be collected, than from the direct collection from the donor. While this should not have an effect on the model's ability to accurately identify collected samples, it may require an adjustment of collection method to ensure that enough sample is collected for analysis. Should this occur, extra swabbing, soaking, and centrifugation steps may be necessary in order to create a system of collection that is viable for analysis from non-porous substrates. Porous substrates should not show as much of a difference in sample collection, as cotton swabs are also porous substrates, and the porous fabric substrates will undergo direct collection and extraction, just as cotton swabs do.

IV. Budget

Item	Quantity	Unit Cost	Total Cost
PLS Toolbox Extension	1	$174.00	$174.00
Puritan Sterile Regular Tip Cotton Swab, Wood Shaft, Transport Tube (25-806-1WC-BT)	1	$55.00	$55.00
Clean-Wipes Pre-moistened IPA Wipes (06-665-24)	1	$44.05	$44.05
Pipette Tips (Universal Fit)	6	$23.00	$138.00
DNA IQ Spin Baskets	4	$41.00	$164.00
Disposable Vials	1	$120.00	$120.00
Paper Bags	1	$8.99	$8.99
Moisturizer	1	$15.97	$15.97
Silicone Based Lubricant	1	$14.99	$14.99
Water Based Lubricant	1	$9.99	$9.99
Aluminum Foil Tape	5	$13.00	$65.00
Microscope Slides (Case: 20 boxes of 72)	4	$143.60	$574.40
Petri Dishes, Polystyrene, Disposable, Sterile, 100 x 15 mm, Pack of 20	5	$5.35	$26.75
Med Pride Nitrile Exam Gloves, Powder-Free, Large, Box/100	1	$9.98	$9.98
Aurelia: Distinct Latex Powder Free 100/Box Small 29226-S	10	$15.49	$154.90
Travel Cost to NEAFS	1	$911	$911
		Total:	$2487.02

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Carol de Forest Research Grant Report
Mary Corrigan

Effects of Ethanol on GABA Transaminase

Ethanol is the primary active ingredient in alcoholic beverages, and functions in the body as a central nervous system (CNS) depressant. The overt effects ethanol has on the body, e.g. diminished cognitive ability, loss of motor control, slurred speech, impaired balance, etc., are well documented. While the behavioral consequences of consumption are well understood, how ethanol actually functions on a mechanistic level to elicit those effects has yet to be satisfactorily elucidated. We hypothesized that ethanol acts as an inhibitor of the enzymes responsible for breaking down GABA, GABA-transaminase and succinyl-semialdehyde dehydrogenase. This would lead to elevated levels of GABA in the CNS and explain the depressant effects seen by alcohol consumption.

To test this hypothesis, we modified the enzyme assay protocol outlined in Tsukatani, Higuchi & Matsumoto (2005). Activity of the enzyme system was measured indirectly by the amount of NADH produced using a UV-Vis spectrophotometer @ 340 nm. A series of substrate-velocity experiments were conducted with varying concentrations of GABA to evaluate the ethanol-based inhibition of the enzyme system. To isolate the effect on GABA-T, we utilized a pre-incubation period where the necessary cofactor for the oxidation by SSADH, NAD+, was initially withheld. After the pre-incubation, NAD+ was added to the reaction and the absorbance was monitored. As such, if and to the extent that ethanol inhibited the GABA-T reaction, the concentration of SSA available as a substrate for the subsequent NAD+ dependent reaction would be reduced.

Michaelis-Menten coefficients (K_M) and maximal reaction rates (V_{MAX}) were then determined to evaluate the type inhibition recorded. V_{MAX} was unaffected by the addition of ethanol. K_M of the enzyme system as a whole, and specifically for GABA-T, was increased upon the addition of ethanol. These findings are characteristic of competitive inhibition. Therefore, at physiologically relevant levels, (e.g. 0.1, 0.2 and 0.37 g/dL) ethanol acts as a competitive inhibitor of GABA-T, which can explain a least in part, some of the GABA-nergic behavioral effects seen with alcohol consumption.

Investigation and Detection Methods for Digital and Penile Penetration without Ejaculation

Brianna M. Gregory, M.S.F.S, Amrita Lal-Paterson, M.S.F.S., Lawrence Quarino, Ph.D., and Janine Kishbaugh, M.S.F.S., Cedar Crest College*

Final Report

72-hour results:

Couples 1, 2, 3, 4 and 5 submitted a complete collection packet. Couples 6 and 7 participated in only the digital penetration samples. Couple 8 only participated in the 24-hour time interval penile penetration sample set and did not complete any samples from the 72-hour time interval. The sample that resulted in the best DNA profile at 72 hours for each couple is listed in TABLE 2.

TABLE 2 – *The sample types that resulted in the best male DNA profiles at 72 hours.*

	% Profile	Collection location
Couple 1	100	Penile penetration – vaginal swabs
Couple 2	52	Digital penetration with and without saliva – external genitalia swabs
Couple 3	52	Digital penetration with saliva – external genitalia swabs
Couple 4	100	Digital penetration without saliva – vaginal swabs
Couple 5	70	Digital penetration with saliva – external genitalia swabs
Couple 6	83	Digital penetration without saliva – external genitalia swabs
Couple 7	43	Digital penetration without saliva – vaginal swabs
Couple 8	NA	NA

The best profiles obtained for each sample type from each couple were compiled. The results from the 72-hour time interval were compiled into TABLE 3. The maximum number of alleles obtained was compared to the maximum number of alleles possible which was 23. The ratio of the number of obtained alleles to the total possible number of alleles was converted to a percentage. A graphical representation of the percentage of alleles in a profile for each couple at each sample type for the 72-hour time interval can be seen in FIG. 3. Two couples produced a full profile for at least one type of sampling interval at the 72-hour time interval that 7 couples participated in (29%). For the remaining five couples, all of them obtained at least one profile from any sample location. All couples produced results at the 72- hour sampling time interval. Another graphical representation of the percentage of alleles in a profile for each sample type per couple for the 72-hour time interval can be seen in FIG. 4. Couples consistently obtained profiles with all 5 sample types and full profiles were seen in internal vaginal swabs for digital penetration without saliva and penile penetration samples.

TABLE 3 – *The total number of alleles and percent profile of each sample type at 72 hours.*

Couple #		PP	EDS	VDS	EDNS	VDNS
1	Total Allele #	23/23	3/23	2/23	21/23	11/23
	Percent Profile (%)	100.0	13.0	8.7	91.3	47.8
2	Total Allele #	3/23	12/23	4/23	12/23	4/23
	Percent Profile (%)	13.0	52.2	17.4	52.2	17.4
3	Total Allele #	9/23	12/23	4/23	3/23	1/23
	Percent Profile (%)	39.1	52.2	17.4	13.0	4.3
4	Total Allele #	22/23	11/23	12/23	20/23	23/23
	Percent Profile (%)	95.7	47.8	52.2	87.0	100.0
5	Total Allele #	3/23	16/23	10/23	7/23	4/23
	Percent Profile (%)	13.0	70.0	43.5	30.4	17.4
6	Total Allele #	NA	9/23	12/23	19/23	5/23
	Percent Profile (%)	NA	39.1	52.2	82.6	21.7
7	Total Allele #	NA	5/23	8/23	6/23	10/23
	Percent Profile (%)	NA	21.7	34.8	26.1	43.5
8	Total Allele #	NA	NA	NA	NA	NA
	Percent Profile (%)	NA	NA	NA	NA	NA

PP=penile penetration, EDS=external genitalia digital penetration with saliva, VDS=vaginal digital penetration with saliva, EDNS = external genitalia digital penetration no saliva, VDNS=vaginal digital penetration no saliva, NA = not applicable

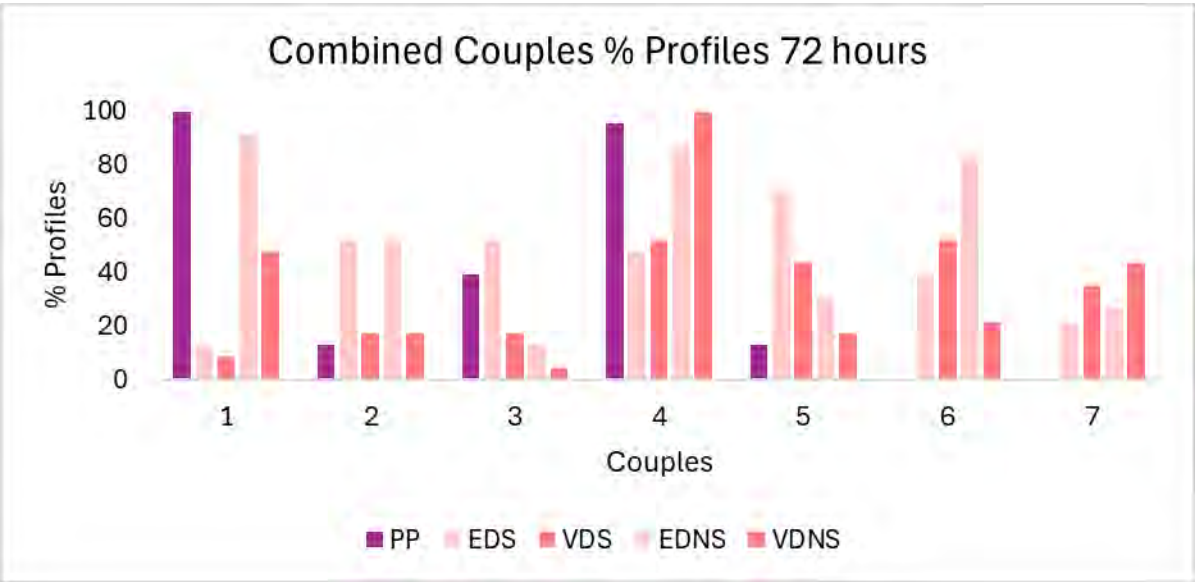

FIG. 3– *Percent profile from each couple at each different sampling location at the 72-hour time interval.*

PP=penile penetration, EDS=external genitalia digital penetration with saliva, VDS=vaginal digital penetration with saliva, EDNS = external genitalia digital penetration no saliva, VDNS=vaginal digital penetration no saliva

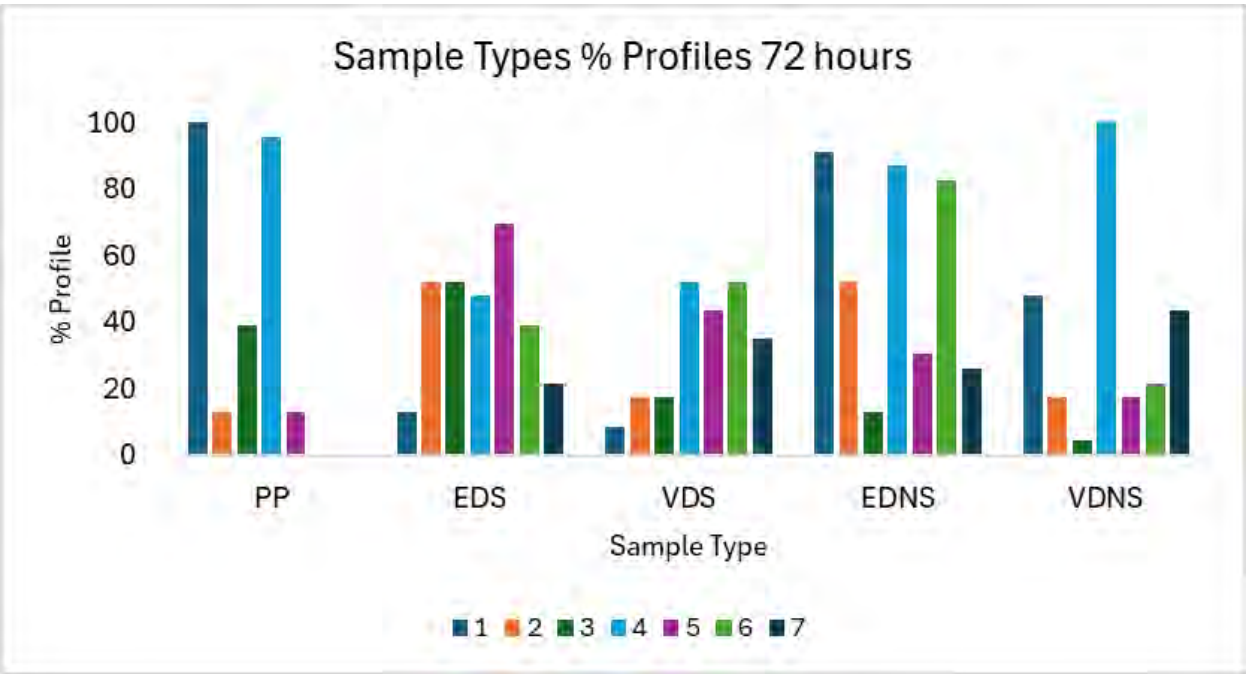

FIG. 4 – *Percent profile at each sampling location for each couple at the 24-hour time interval.* PP=penile penetration, EDS=external genitalia digital penetration with saliva, VDS=vaginal digital penetration with saliva, EDNS = external genitalia digital penetration no saliva, VDNS=vaginal digital penetration no saliva

Conclusions:

Results from this study indicate that male DNA can be detected from all areas sampled as well as for each type of penetration after both 24 and 72 hours. All of the couples that completed samples did display different results, but overall, this study did confirm that it is possible to obtain male DNA in rape cases where no sperm would be detected. At the 72-hour time interval there was a general overall decrease of alleles present compared to the 24-hour samples which was expected due to the delay in collection, but there are alleles present at every sample set from every couple that was tested.

Because these are sexual assault simulated samples, it is expected that there will be a number of variables at play that could alter the amount of male cellular material that was subsequently collected and detected. Some examples of the variability exhibited in this study

included blind swabbing, distance of swabbing, amount of saliva deposited, male shedder status natural vaginal environment, menstrual cycle, female birth control usage and hygiene. This variability emphasizes the importance of obtaining the correct information from the sexual assault victim's background while collecting the SAK.

Female birth control usage was one variable that may have affected the persistence and survival of epithelial cells deposited by the male because these cells are foreign to the female body. Based on the results, it was determined that there is no definite conclusion on whether the use of birth control affected the samples that were obtained due to the other variables listed above. For example, couple 6 reported no birth control use and exhibited some of the poorest combined results from 24 and 72 hours whereas couple 4 reported the use of oral contraceptives and obtained some of the best results of the study. Overall, usage of birth control could be relative to an individual and could either negatively impact results or have no effect on results.

Overall Significance and Recommendations:

Overall, one of the goals of a SAK is to get the best possible DNA results in order to help find an unknown perpertrator. The use of Y-STR analysis is important because not only can it identify if sexual activity occurred, but results of this study indicate that a full or partial Y-STR profile can create an investigative lead for law enforcement officers or can exclude a possible suspect, which is just as powerful as an inclusion. With regards to collection location of internal compared to external, obtaining a full or partial male DNA profile from either location indicates that transfer of male DNA to the female victim occurred in some capacity.

Some practices that can be recommended from this study based on the data are to collect all types of samples including blind swabbing internally for pediatric cases and collecting external

genitalia swabs for both pediatric and adult cases. As stated in the 6 month update as well, in terms of analysis recommendations, the optimized extraction method of the separation of half swabs could be implemented to increase the amount of DNA extracted. Furthermore, incorporating an increased injection time for genotyping in the typical workflow can help to increase peak heights of the alleles present in the sample.

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NORTHEASTERN ASSOCIATION OF FORENSIC SCIENTISTS

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, IAI, ABFT or the NFSA Certified Forensic Manager Series exam. This offer is for any exam completed during the current year. After passing the examination, please fill out the Certification Reimbursement Form (https://www.neafs.org/certification). The reimbursement is based on a first come first served basis. Remember you must pass the ABC, IAI, ABFT or NFSA Certified Forensic Manager Series exam to be considered for reimbursement.

For more information about the examination sitting, please contact...

The Certification Chair at certification@neafs.org

For more information about certification with the ABC, please visit...

American Board of Criminalistics
http://www.criminalistics.com

For more information about certification with the IAI, please visit...

The International Association for Identification
https://www.theiai.org/certifications.php

For more information about certification with the ABFT, please visit...

The American Board of Forensic Toxicology
https://www.abft.org/certification/

For more information about certification with the NFSA, please visit...

The National Forensic Science Academy
https://thenfsa.org/wp-content/uploads/2023/10/CFM-Certification-FAQ.pdf

>>> NOW ACTIVE <<<

SCIENCE DIRECT SUBSCRIPTION

INFORMATION

>>> READ MORE

Our organizational subscription to Science Direct is now active, and we are thrilled to announce that all members may now submit a request to receive their login credentials. The subscription covers almost 800 scientific journals (list attached) in the Physical Sciences category – one which we felt covered as much of the diverse and technical disciplines within our organization as possible while also maintaining a financially responsible commitment.

HOW TO ACCESS

READ MORE <<<

In order to request your credentials, you must log in to the Member Area of the NEAFS website by navigating to www.neafs.org and selecting “Member Area” under the “Membership” header on the main page. There you will be prompted to enter your name, preferred e-mail address, and member number. In return, you will receive an e-mail from a member of our board and staff with your registration ID and password. Instructions on how to activate will be attached to the email.

ADDITIONAL INFORMATION

>>> READ MORE

By requesting your Science Direct credentials, you agree to the following terms and conditions listed on the NEAFS website. All of this information will also be hosted on the Member Area of the website for future reference along with a listing of journals that can be accessed with the subscription. If you have any questions, please contact Stephanie Minero (presidentelect@neafs.org).

NEAFS has partnered with

SPEAKHIRE

Developing Tomorrow's Leaders

SPEAKHIRE develops the social and cultural capital of individuals from immigrant families to become leaders in the workforce.

Spanish-speaking Champions needed

Become a Champion

SPEAKHIRE ensures diverse individuals get a fair chance of pursuing colleges and careers of their choice. We envision a future workforce with more professionals of color of all backgrounds in positions of power across a variety of careers.

If you're looking for an opportunity to empower the next generation of leaders, join SPEAKHIRE as a Career Pathways Champion. Deliver a Seminar about a career skill, coach a young person through the Foundational Year, or share your school to career pathway through Pathways Days or SPEAKHIRE Series. As a Champion, you help young people explore careers and learn early career skills, supporting them as they pursue a career pathway, preparing them for future careers, and empowering them toward life success.

LEARN MORE AT HTTPS://WWW.NEAFS.ORG/SPEAKHIRE

NORTHEASTERN ASSOCIATION OF FORENSIC SCIENTISTS

TRAINING SCHOLARSHIP FUND

OPEN APPLICATION PERIOD
JANUARY 1st to DECEMBER 31st
OF THE CURRENT YEAR

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. For additional instructions, requirements and forms visit the NEAFS website.

https://www.neafs.org/trainingscholarshipfund

TRAINING OPPORTUNITIES

2025 Current Trends in Seized Drugs Analysis Symposium

Tuesday, January 14th, is SWGDRUG day for the 2025 Current Trends in Seized Drugs Analysis Symposium! Register now for the symposium that is scheduled January 13-17, 2025.

https://www.cfsre.org/education/continuing-professional-education/online-live-education/current-trends-in-seized-drug-analysis-symposium-2025

AFQAM Cooperative Training Program

The AFQAM Executive Board is pleased to announce the release of the AFQAM Cooperative Training Program! This training program is designed for those new to forensic quality assurance and will provide a key steppingstone to achieving success in the position and with the responsibilities. The training program was developed by experienced forensic quality assurance experts and is broken up into courses that focus on key topics in quality assurance. The first two courses available are 'Introduction to ISO' and 'Accreditation – What Is It Good For?'.

The AFQAM Cooperative Training Program is open to everyone, and you do not need to be an AFQAM member to participate. Each course can be purchased individually, and a certificate of completion will be given to the student at the successful completion of the course. The interactive training will keep you engaged, motivated, and eager to learn as you progress through the course.

This training program is ideal for those new to quality assurance or interested in quality assurance such as new Quality Manager's, Technical Leader's, new hires, or other roles that assist with quality assurance in the laboratory. Whether you are simply seeking to learn more about what the job entails, or seeking tools to help you succeed in your job, this is for you!

To review the available courses and register please follow this link: https://afqam.org/cooperative/. Additional courses will be released in the near future. For questions, please email contact@afqam.org.

TRAINING OPPORTUNITIES

Fire Debris Analysis

for the Forensic Chemist

The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) will be offering the *Introductory Fire Debris Analysis for the Forensic Chemist* class for US federal, state, and local government laboratory analysts from July 21-24, 2025. This is a four-day course designed for analysts in the early stages of fire debris training or with less than a year experience in conducting fire debris analysis casework. The course is tuition-free and will be offered at the ATF Forensic Science Laboratory – Washington in Beltsville, Maryland.

Introductory Fire Debris Analysis for the Forensic Chemist covers the basic theory and concepts analysts need to understand in order to help them gain initial competency from their agency. Classroom learning will be enhanced with hands-on exercises and small group assignments.

Topics covered include organic chemistry basics, petroleum refining, GC-MS, classification, extraction, fire chemistry basics, evidence packaging, and report writing.

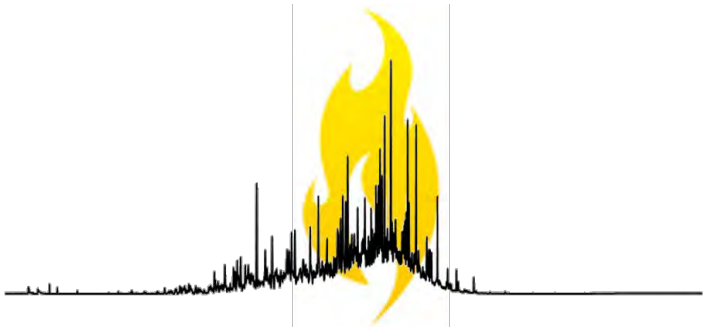
Course Offering

July 21-24, 2025 (travel days July 20 and July 25):

Introductory Fire Debris Analysis for the Forensic Chemist

Although the class is tuition-free, travel costs and per diem expenses are the responsibility of the student or student's agency.

Please contact firedebrisclass@atf.gov with any questions or to register for the upcoming *Introductory Fire Debris Analysis for the Forensic Chemist* course.



APPLICATION FORM

What: *Introductory Fire Debris Analysis for the Forensic Chemist*
When: July 21-24, 2025 (travel dates July 20 and 25)
Where: Bureau of Alcohol, Tobacco, Firearms and Explosives
Forensic Science Laboratory-Washington
6000 Ammendale Road, Beltsville, MD 20705

Please type or print legibly:

1. Name (last, first middle)_____
   Phone Number _____
   Email _____
   US Citizen ☐ YES ☐ NO (Note: non-US citizens will require additional paperwork)

2. Current Job Title _____
   Years in Current Position _____
   Agency Name _____
   Agency Address _____
   Supervisor Name/Phone/Email _____
   _____

3. Fire debris analysis experience/training

   I am currently in a fire debris training program or have recently completed one:
   YES ☐ training start date:_____ ☐ NO, I am not currently in training
   If training recently completed, provide date authorized to perform casework_____
   Number of fire debris examiners in your laboratory_____
   Participant Signature: _____ Date: _____

   Supervisor Signature: _____ Date: _____

Email completed applications to FireDebrisClass@atf.gov by March 31, 2025.

*Travel costs/lodging are the responsibility of the student.
**Upon acceptance to the class, a student commitment to attend is required. Written notification from the student's supervisor must be received prior to July 14, 2025, if an unforeseen reason arises that causes the student to miss the course offering.

NJIT New Jersey Institute of Technology

New Jersey Innovation Institute
An NJIT Corporation

The Learning and Development Initiative

Basic Analysis of Friction Ridge Skin

This course is designed to prepare new latent print examiners for the technical foundation necessary to properly examine fingerprints as a method for identification.

Monday, July 14, 2025 - Friday, July 18, 2025, 8:30am-4:30pm (EDT)

Location: NJIT Campus, Newark, NJ

Successful completion of this course (35 hours) may be used toward the IAI certification application or re-certification process. Scan the QR code or go to ldi.njit.edu for details regarding registration and tuition.

LDI
The Learning and Development Initiative

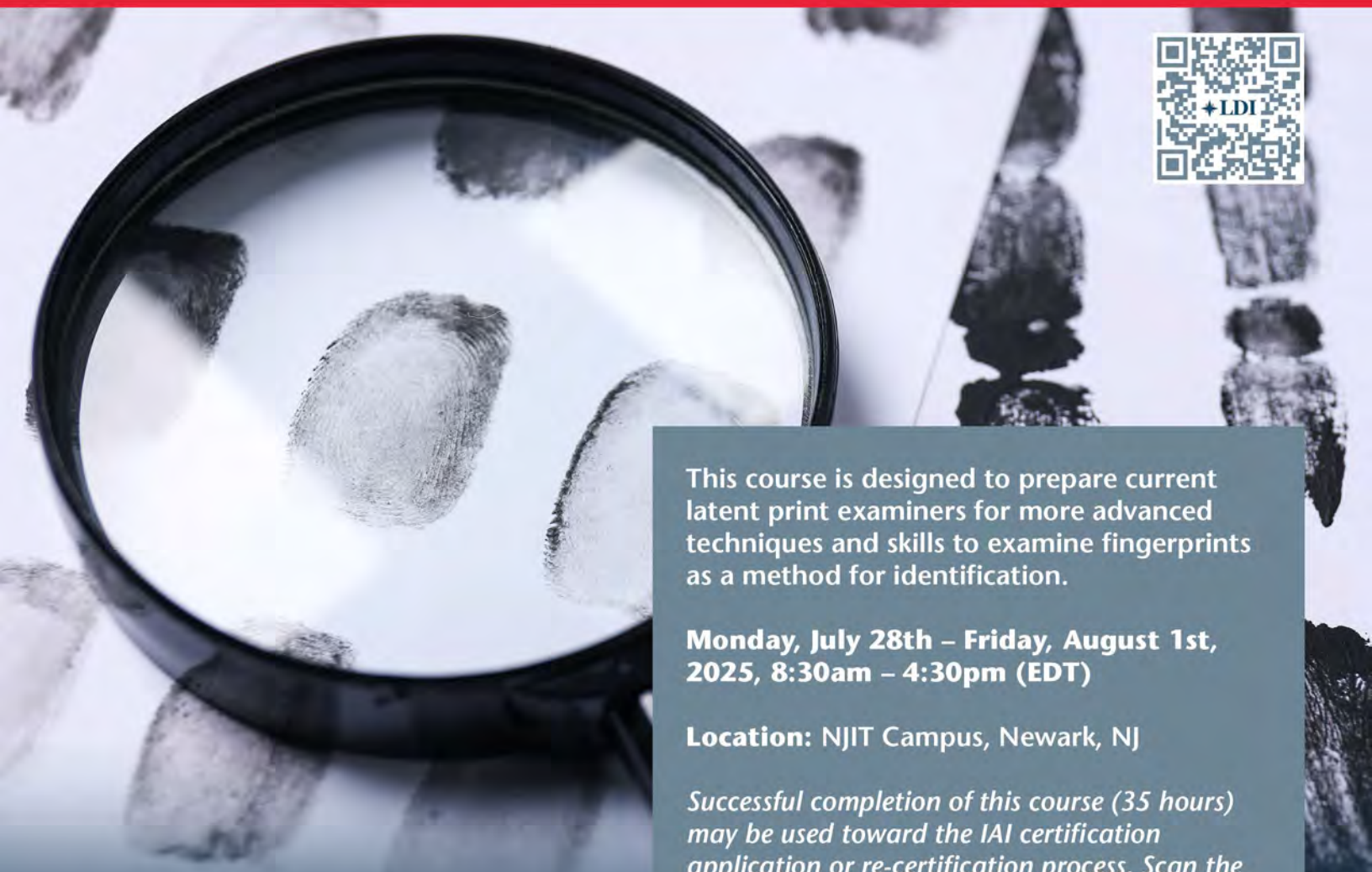
LDI.NJIT.EDU

NJIT New Jersey Institute of Technology

New Jersey Innovation Institute
An NJIT Corporation

The Learning and Development Initiative

Intermediate Analysis of Friction Ridge Skin



This course is designed to prepare current latent print examiners for more advanced techniques and skills to examine fingerprints as a method for identification.

Monday, July 28th – Friday, August 1st, 2025, 8:30am – 4:30pm (EDT)

Location: NJIT Campus, Newark, NJ

Successful completion of this course (35 hours) may be used toward the IAI certification application or re-certification process. Scan the QR code or go to ldi.njit.edu for details regarding registration and tuition.

LDI
The Learning and Development Initiative

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CLICK HERE

FOR EMPLOYMENT OPPORTUNITIES