

10th Annual
FORENSIC SCIENCE RESEARCH DAY



Friday April 20th, 2018

- Regent Theatre -



UOIT Forensic Science Research Day 2018

Program Schedule

8:30 a.m.	Registration	Regent Theatre Atrium
	Refreshments	Upper Mezzanine
8:55 a.m.	Welcome	Kimberly Nugent, <i>Associate Teaching Professor & Capstone Coordinator</i>
9:00 a.m.	Keynote Address	David Robertson, <i>Adjunct Professor</i>
9:20 a.m.	Session I	Chair: Dr. Cecilia Hageman, <i>Assistant Professor</i>
9:55 a.m.	Break	Upper Mezzanine
10:15 a.m.	Session II	Chair: Dr. Michael Corbett, <i>Adjunct Professor</i>
12:30 p.m.	Closing Remarks	Dr. Helene LeBlanc, <i>Associate Professor & Undergraduate Program Director</i>
	Refreshments	Upper Mezzanine

The research conducted by our fourth-year students would not have been possible without the support and mentorship of our supervisors and mentors!

Thank you.

Mission Statement

The Forensic Science program at UOIT strives to create an interdisciplinary learning environment dedicated to education, research, and contribution to the forensic community.

The Forensic Science program endeavours to:

- Advance the highest quality of knowledge, skills and abilities through excellence in teaching and a technologically-enhanced learning environment;
- Foster inquiry, critical thinking and scholarship in innovative research by providing access to state-of-the-art facilities and supervision by internationally recognized faculty and professional experts;
- Actively collaborate with industry to produce outstanding graduates who are consistently sought and highly valued by professional partners and employers;
- Command next-generation leaders demonstrating integrity, ethical behaviour, and professional conduct in the field of forensic science;
- Contribute to society through community participation, leadership and outreach initiatives, with the goal of inspiring youth

Learning Outcomes

A degree is awarded to students who have reliably demonstrated the ability to:

- Apply an in depth knowledge and critical understanding of chemistry, biology, physics, and mathematics to identify, evaluate, analyze and interpret information and hypotheses relevant to forensic science
- Utilize independent learning and analytical skills to solve problems specific to forensic science and broader issues outside the discipline
- Formulate and conduct research or equivalent advanced scholarship in forensic science or a related discipline
- Critically evaluate and describe the principles, concepts, theories and assumptions that form the foundation of forensic science
- Communicate accurately and effectively in written and oral form with members of academia, government and industry, as well as the general public on matters related to the legal applications of science
- Recognize the limitations of the current state of knowledge in forensic science and appreciate the need to adapt to new and emerging technologies in the field
- Pursue further scholarly pursuits, employment, and community involvement to advance the knowledge base in forensic science and contribute towards the economic and societal growth of the community

Forensic Science Program Accreditation

The innovative Forensic Science program at the UOIT has received the prestigious accreditation of the American Academy of Forensic Sciences' Forensic Education Programs Accreditation Commission (FEPAC). It is the second such program in Canada granted this distinction by the Colorado Springs, Colorado-based organization.

Keynote speaker – David Robertson

David Robertson retired from Durham Regional Police Service after almost 36 years in the police service. After three years as a R.C.M.P. Special Constable, he began a long and storied career as a member of Durham Regional Police Service. He served the Durham Regional community in performing general policing duties, branching out into various forensic roles, including acting as a qualified breathalyzer technician, a Scenes of Crime Officer, and an officer in the Forensic Identification Unit. Since his retirement in 2008, he has brought to UOIT's Forensic Science Program a wealth of, and passion for, forensic investigative knowledge, scenes of crime procedures, police practices and expert witness testimony. David currently is an Adjunct Professor in the Faculty of Science and teaches the Crime Scene Science course as well as the Mock Crime Scene Practicum course. This year marks David's 10 year Anniversary with the UOIT Forensic Science Program.

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UOIT Forensic Science

Schedule

8:55 **Welcome:** Kimberly Nugent, MSc

9:00 **Keynote address:** David Robertson

Session I Directed Studies & Mock Crime Scene Practicum Students

Chair: Dr. Cecilia Hageman

The focus of a directed studies project is to *identify* gaps in the research literature. This is achieved by conducting a thorough literature review on a particular subject. Ultimately, the goal is to review the current state of the chosen field, leaving no stone unturned and putting current research into the broader context of forensic science. Students selecting this capstone experience have the opportunity to investigate more diverse subject matter where conducting original research may be difficult. Students are expected to prepare a written document and a 3-minute oral presentation.

The focus of the mock crime scene practicum is to *apply practical skills* to process a complex crime scene. This is accomplished by simulating all the associated events a person may encounter from crime scene to court. This includes extensive documentation of the scene, collection and identification of evidence, creation of detailed logs and forensic reports, and finally testifying as an expert witness in a mock court setting. Students selecting this capstone experience are expected to individually prepare a written report and collaborate on an oral presentation.

9:20 **Marina Halim, Jeremy Reader, Alyssia Robichaud, Kendra Rogers,
Camilla Szyszka and Sarah Wildman**

Mock Crime Scene Practicum Course

9:45 **Tenecia Baptiste-Carmichael**

Factors Affecting the Transfer and Persistence of DNA on Forensic Evidence

9:50 **Natalie D'Hollander**

A Critical Review of Publicly Available Presumptive Tests for Common Substances Used in Drug-Facilitated Sexual Assault

9:55 **Refreshment Break, Mezzanine**

Session II Thesis Research Students

Chair: Dr. Michael Corbett

The focus of a thesis project is to *fill the gaps* in the research literature. This is achieved by reviewing previous studies, designing an experiment and conducting original examinations. Ultimately, the goal is to contribute novel research to a relevant field of forensic science or broader natural science. Students work closely with either internal or external supervisors who mentor them throughout the course of their work. Students selecting this capstone experience are expected to prepare a written thesis and oral presentation.

10:15 **Leanna Calla**

Decreasing PMI Uncertainty using a Simplified Heat Equation

10:27 **Ashley Cheung**

Performance Verification of Raman Spectroscopy for the Forensic Comparison of Reactively-dyed Cotton Fibres

10:39 **Autumn Collins**

Synthesis of Uracil Phosphoramidites with Triazole Modified Backbones as siRNA Therapeutics for Gene Silencing

10:51 **Erin Lusk**

The Validation and Calibration of a Portable Gas Chromatography-Flame Ionization Detector

11:03 **Michelle Haché**

An Examination of Gunshot Residue Sampling on Fabric using the Tape-Lift Method

- 11:15 **Malak Elayas**
Visual Enhancement of Footwear Impressions Containing Salt Residue Using Silver Nitrate
- 11:27 **Mirai Gendi**
*The Effect of Developmental Maturity of Female Blowfly *Phormia regina* (Diptera: Calliphoridae) on EAG response to Decomposition Volatile Organic Compounds*
- 11:39 **Trista Heney**
Accuracy and precision of a three-dimensional (3D) approach to the lead-in method and bullet trajectory reconstruction
- 11:51 **Shannon Law**
The Persistence of Post-Coital Male DNA on Vaginal and External Genitalia Swabs in Relation to Cases of Sexual Assault
- 12:03 **Rachel Banks**
Creation of a Textile Damage Image Library
- 12:15 **Samantha Pontone**
The Effects of Fire and Suppression Techniques on the Detection of Biological Fluids
- 12:30 **Closing Remarks:** Dr. Hélène LeBlanc

Refreshments and Networking Session

The Mock Crime Scene Practicum Course

Marina Halim¹, Jeremy Reader¹, Alyssia Robichaud¹, Kendra Rogers¹, Camilla Szyszka¹, Sarah Wildman¹, Det./Constable David Robertson¹, Stephanie Kolodij, MSc¹, Kimberly Nugent, MSc¹

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The Mock Crime Scene Practicum allows students to bridge the gap between theoretical learning and practical application. Students investigated a simulated crime scene that spanned seven weeks. From crime scene to court, students worked in pairs to process a scenario of an alleged bank robbery.

The investigation took place at the UOIT Crime Scene House, and the undergraduate teaching laboratory. Students documented and analyzed evidence collected from all three scenes using CrimePad and OneNote technology. Photography and field skills were honed and applied at a higher level than in previous years. Evidence and subsequent analyses were wide-ranging and included impression evidence, suspected drug samples, weapons and document examination of indented writing and chemical enhancements, as examples. The investigation culminated with a police report summarizing the actions, findings, and conclusions, followed by a case review with the Case Manager in charge.

Through the capstone experience, students further developed their judgment, critical thinking, and deductive reasoning skills, by independently solving the challenges presented to them.

Factors That Affect the Transfer and Persistence of DNA on Forensic Evidence

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Advancements in technology have allowed for the detection of minute quantities of deoxyribonucleic acid (DNA). DNA, which can be present in the form of hair, blood, semen, and epithelial cells, is easily and frequently transferred either directly or indirectly from person-to-person, person-to-surface or surface-to-surface. Indirect transfer may allow DNA to be transferred between otherwise unrelated people or objects. DNA is particularly important to forensics, due to its discriminatory power, propensity to be transferred, and persistence in the environment. This literature review aims to provide a summary of the factors affecting transfer and persistence of DNA as well as the future considerations for trace DNA analysis.

Several studies have identified common factors affecting the transfer and persistence of DNA, such as “shedder status”, the degree of transfer, exposure to the elements as well as activities performed around the time of transfer.

Looking ahead, mixture profiles are an important consideration for the field of DNA analysis. What’s more, STRmix™ is a software currently used in the field that uses Bayesian probability formulas to make an educated guess as to what the most probable allele combination is at a specific locus. Current research is extending the use of Bayesian networks to attempt to distinguish primary from secondary transfer by taking in to account the factors involved in transfer of DNA. These new techniques look promising in answering some of our biggest questions.

A Critical Review of Publicly Available Presumptive Tests for Common Substances Used in Drug-Facilitated Sexual Assault

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Drug-facilitated sexual assault (DFSA) occurs when alcohol or drugs are used to compromise an individual's ability to consent to sexual activity. The covert administration of so called 'date rape drugs' to alcoholic beverages represents a widely feared phenomenon. Multiple presumptive testing products have been created, that claim to reduce the likelihood of the user's potential victimization. This paper represents a critical review of these products and the presumptive procedures that they employ in order to determine the practicality of encouraging the use of this technology. The scientific, social and legal implications of the sale and use of these products were considered and explained. This included discussions surrounding the synthesis of illicit compounds that imitate the effects of common substances used in drug-facilitated sexual assault, the concern for an unsubstantiated amount of user confidence in the results, the product's implicit inference of victim responsibility, and the ambiguity in regards to legal culpability upon a false positive or negative result. Ultimately, the use of these tests may be, at best, a temporary solution to the overarching societal problem of the perpetration of sexual assault.

Decreasing PMI Uncertainty using a Simplified Heat Equation

Leanna Calla ¹, Sean Bohun, PhD.¹, H       LeBlanc, PhD¹

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When a body is found, forensic scientists must often turn to entomologists to determine the post-mortem interval (PMI). Primary colonizing organisms will be sampled and aged. To accurately do this, temperature profiles at the scene, prior to discovery, are required.

The purpose of this research has been to find a mathematical model that can be used as a predictive tool to obtain temperatures characteristic to a given scene. Current methods require data from an Environment Canada station and data from a datalogger left at the scene to create a predictive equation. However, this model overlooks the differences that occur in the weather conditions in the vicinity of the body in comparison to the conditions at the weather station. For increased accuracy, weather stations are located in open fields while crime scenes are often considerably more secluded. With a simplified heat equation as a predictive tool and data from a datalogger at the scene, local environmental temperature profiles can be found. These profiles will then be compared to the data from Environment Canada to find the appropriate relationship. This connection will allow for the model to predict temperatures at the scene in the past. In future work, the model will be able to account for a wider range of weather events to better predict temperatures at the scene. With reasonable temperature predictions into the past, the PMI may be estimated with a high degree of accuracy.

Performance Verification of Raman Spectroscopy for the Forensic Comparison of Reactively-dyed Cotton Fibres

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Coloured fibres are an important and frequently encountered form of trace evidence that have the potential to link different aspects of a crime due to their high degree of variability. Currently, the standard method for fibre colour comparison involves optical light microscopy and microspectrophotometry, followed by thin-layer chromatography. Thin-layer chromatography differentiates similarly coloured fibres with differing dye compositions however it is a destructive technique since it requires the extraction of dyes from the unknown fibres.

The ability of Raman spectroscopy to discriminate reactively-dyed cotton fibres was investigated to determine whether it could be used in place of thin-layer chromatography in forensic fibre casework analysis. Fibre samples are prepared differently for microspectrophotometry and Raman spectroscopy, so the ability of the latter to produce similar results for both sample preparations was also investigated. An additional analysis was to determine whether examination time could be reduced by eliminating sample preparation between the two analysis methods.

Several parameters of Raman spectroscopy were investigated to determine the optimal conditions for sample analysis (reactively-dyed red, navy blue, and black cotton fibres). Laser wavelength was examined and results concluded that 532 nm provided the best results for black fibres, 785 nm provided the best results for red fibres, and similar results were observed with both laser wavelengths for navy blue fibres. Raman spectroscopy was capable of discriminating similarly coloured fibres with differing dye compositions. Similar results were obtained for fibres prepared for microspectrophotometry for all fibre colours analysed. Although further research is required, Raman spectroscopy shows promise as a method of analysis to replace thin-layer chromatography.

Synthesis of Uracil Phosphoramidites with Triazole Modified Backbones as siRNA Therapeutics for Gene Silencing

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Currently, research into therapeutics to target gene-dependent diseases such as cancer is being explored. This uses ribonucleic acid (RNA) and more specifically short interfering RNA (siRNA) to silence the genes. This is done through the use of the Post-Transcriptional Gene Silencing Pathway (PTGS) which causes the degradation of messenger RNA (mRNA) which are vital to cells in our body. siRNA can be coded to target these mRNA however, when it is not modified it is not very effective due to not being able to cross the cell membrane easily as well as it can be quickly degraded in the body. In this project, the modification of the base Uracil's backbone was looked at. The modification incorporated was a triazole ring. This modification replaces two base pairs with a neutral backbone linker which could make this siRNA to more stable and more easily delivered. To synthesize this triazole modification an azide and an alkyne is needed. This project successfully synthesized these compounds as well as an uracil modified backbone monomer. In the future, this monomer will now be able to be phosphitylated which in turn will enable it to be incorporated into siRNA as a DMT-Phosphoramidite building block. This can then be used for biological testing to determine gene silencing efficacy.

The Validation and Calibration of a Portable Gas Chromatography Flame Ionization Detector

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One of the most widely abused substances in the world is alcohol. Though primarily ingested in alcoholic beverages as ethanol, other commonly abused alcohols include methanol, acetone, and isopropanol. The accurate measurement of blood alcohol concentration (BAC) is essential in many forensic contexts. Field measurements of breath alcohol concentration (BrAC) are often confirmed in a laboratory setting with gas chromatography (GC). This technique, however, can be cumbersome, and in cases where analysis needs to be done on site, or time is a constricting factor, this can be an issue. A proposed solution for this is the implementation of a portable GC instrument. However before analysis can become routine, the method must first be validated.

Using samples of the four alcohols (i.e. ethanol, methanol, acetone, and isopropanol) along with N-propanol as an internal standard (IS), a GC method was developed for the optimal separation of each alcohol, which was then used to create calibration curves. In addition to assessing the linearity of instrument response, these calibration curves were used to quantify unknown samples in a blind experiment to assess accuracy. Precision and robustness were evaluated through a series of intra-day and inter-day variability experiments. The limit of detection (LOD) and limit of quantitation (LOQ) were not successfully established in this experiment.

The results of this preliminary study are encouraging, though more research is needed. The portable GC with flame ionization detector (FID) used in this study has the potential for the accurate and precise analysis of alcohols. In the future, this instrument could be integrated into an undergraduate teaching laboratory.

An Examination of Gunshot Residue Sampling on Fabric using the Tape-Lift Method

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The analysis of gunshot residue (GSR) on clothing may provide crime scene investigators with valuable information as to a person's involvement in a firearms-related offence. The goal of this study was to examine the efficiency of using the tape lift method to collect GSR from clothing, and to determine if 40 dabs is the most efficient sampling number. Three experiments were performed to examine the number of GSR particles that could be collected after 4, 40, and 80 dabs on a gunshot residue bearing fabric, as well as to assess the possibility of obscuring particles after dabbing on a clean surface. GSR particles were collected from cotton wipes using double-sided adhesive coated metal stubs and then analyzed for particles containing lead, barium, and antimony using scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM/EDX). Significantly more 3-component GSR particles were found after 80 dabs than after 40 dabs, with little debris interference. This study demonstrated that GSR sampling efficiency using the tape-lift method could be improved by using a larger number of dabs. The possibility of using more than 80 dabs should be investigated in future studies.

Visual Enhancement of Footwear Impressions Containing Salt Residue Using Silver Nitrate

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There are many chemical reagents used for the visual enhancement of impression evidence. Unfortunately, there is not a suggested chemical for visually enhancing footwear impressions containing salt residue. This study aimed to identify a chemical reagent that reacts with salt, that would create allow for enhanced visualization of an impression.

Three common salt brands were examined against six silver nitrate solutions, in order to identify the optimal concentration at which visual enhancement of a salt residue impression. Tests were conducted under laboratory conditions in the UOIT teaching laboratory. Impressions were created using a size 7 women's boot and deposited onto three different substrates (ceramic tile, vinyl tile, and plexi-glass) in a depletion series. A total of 243 samples were produced. Salt type and concentration, drying-time, surface material, and depletion series impressions were analyzed. The optimal silver nitrate concentration of the six solutions was found to be 5% silver nitrate in 10% methanol. Footwear impressions were visualized in detail on both the ceramic and vinyl tile, with the use of the 5% silver nitrate in 10% methanol. Serial impression and drying times also affected the detail and quality of the impressions. This project demonstrates that latent footwear impressions containing salt, are best enhanced with a 5% silver nitrate solution. This in turn improves the documentation process since these impressions contain a greater level of detail and may allow for the examination of class and individual characteristics.

The Effect of Developmental Maturity of Female Blowfly *Phormia regina* (Diptera: Calliphoridae) on EAG response to Decomposition Volatile Organic Compounds

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Blow flies (Diptera: Calliphoridae) are the primary colonizers on decomposing remains due to their attraction to the emanating volatile organic compounds (VOCs). VOCs that are attractive to primary insect colonizers are present in higher concentrations during the early stages of decomposition: the fresh, bloat and active stages. Blow flies depend on these chemical signals to determine the propriety of the corpse as a source of food, mating and suitable oviposition location. Electroantennogram (EAG) detection allows for the isolation and subsequent identification of behaviour inducing compounds. As newly emerged adult female flies continue to develop, their olfaction acuity to the decomposition VOCs will vary. Early publications stress that female flies' sensitivity to VOCs are at their peak as virgins; not receiving a blood meal for sexual organ development. However, blow flies which are of forensic interest are normally gravid (carrying eggs) and searching to lay their eggs. In this study, EAG experiments were conducted on adult female *Phormia regina* at three developmental stages in order to determine which stage was most acute to decomposition VOCs. Our objective is to determine when adult females are most sensitive to decomposition VOCs in order to conduct relevant behavioural studies. Results indicated that gravid female flies are the most sensitive to VOCs associated with early stages of decomposition, followed by virgin female flies, followed by unmated female flies. Likewise, responses to VOCs that are associated with middle stages of decomposition are primarily attractive to unmated female flies, followed by the response of both gravid and virgin female flies.

Accuracy and precision of a three-dimensional (3D) approach to the lead-in method and bullet trajectory reconstruction

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Crime scene reconstruction (CSR) is a discipline in forensic science that is used in efforts to reconstruct a sequence of events. A significant branch of CSR is shooting incident reconstruction which often deals with determining the trajectory of a bullet. Trajectory determination may be used in reconstructive efforts to indicate the position of a shooter during the commission of a crime. Current methods available for the determination of a bullets path include (but are not limited to) the ellipse method, probing with trajectory rods and the lead-in method. Not all methods are equal in their ability to provide accurate and precise trajectory estimations and a forensic examiner must make efforts to utilize a method that is less intrusive, allowing for evidence preservation and maintenance of original integrity.

The goal of this study was to assess the accuracy and precision of a new 3D approach to the lead-in method. In this study, bullet deformations resulting from impact angles of 50-10 degrees were examined using the ellipse method, traditional lead-in method and 3D lead-in method. The developed 3D approach consisted of creating a 3D model of the defect with photogrammetry. This 3D model was analysed in Autodesk® 3ds Max 2018, a 3D modelling software. A total of 25 angle estimations for 25 individual bullet defects were made for each method. Accuracy and precision were then used as measures in determining the most suitable method for trajectory reconstruction efforts. This study found that the ellipse method was the least suitable method while the traditional lead-in method and 3D approach showed comparable accuracy and precision with the 3D approach being slightly more precise overall. This study shows that further exploration of a 3D approach to the lead-in method is warranted.

The Persistence of Post-Coital Male DNA on Vaginal and External Genitalia Swabs in Relation to Cases of Sexual Assault

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Forensic biology plays a major role in the investigation of sexual assault cases. The analysis of these cases relies on the collection of vaginal and external genitalia swabs. However, external genitalia swabs are not consistently collected by sexual assault nurse examiners. The post-coital interval is also an important factor in sexual assault evidence collection; DNA evidence is rarely collected after the maximum time period determined for male DNA persistence in the vaginal cavity.

The goal of this study was to determine if male DNA could consistently be detected after 5 days, post-coitus and to determine if external genitalia swabs produce more informative DNA profiles than do vaginal swabs. This study also attempted to correlate the results found in the laboratory to cases of sexual assault analyzed at the Centre of Forensic Sciences. In this study, six donor couples swabbed at various times following an act of intercourse. Both vaginal and external genitalia swabs were taken at various time points from 1 hour to 14 days. Samples were analyzed for male DNA by extraction, quantitation, amplification, detection and profile development. Male DNA was consistently detected past the 5-day mark. Autosomal DNA profiles with over 50% of the loci attributable to the male partner were seen up to 12 days for vaginal samples and 14 days for external genitalia samples. Autosomal profiles were more informative relative to the male contributor for the external genitalia samples. Y STR profiles were developed at 14 days, post-intercourse, for both vaginal and external genitalia samples. This study suggested that external genitalia swabs have high potential evidentiary value and should perhaps be implemented into the regular sexual assault evidence kit collection procedure. Also, this study indicated that male DNA consistently remains detectable on and within the female genitals longer than 5 days. There was no identifiable pattern seen in the sexual assault cases related to post-coital interval and informativeness of external genitalia swabs versus vaginal swabs.

Creation of a Textile Damage Image Library

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Forensic textile damage analysis methods are still developing; currently there is no set standards for comparisons. Examiners must perform simulation experiments to test hypotheses and compare the characteristics of the simulated damage to evidence.

The goal of this study was to construct a Textile Damage Image Library database where the results of simulation studies on textile damage could be compiled. This database would include the details of each sample as well as photographs of the fabric damage, while having the ability to refine search results. The initial data for the database was obtained in this study. Four fabrics new to the market, “breathable” underwear, stretchy Denim, Dri-Fit, and Denim, were washed to simulate “new” and “used” materials. Damage types focused on in this study were tearing, scissor cuts, and knife cuts. Knife damage was performed using three knives, which varied in blade width, previous usage, and blade type (smooth or serrated). Also, the knife damage was repeated with Knife #2 while stretching the fabric to simulate clothing as if it was worn. The microscopic characteristics of the severed yarn ends of the scissor damage was distinguishable from the tear damage. Additionally, the fabric type, direction of the cut, as well as the absence of stretching were significant factors that affected the cut length for some simulations. This study suggests that the length of the knife cuts depends on numerous variables, many of which should be further researched and incorporated into the database.

The Effects of Fire and Suppression Techniques on the Detection of Biological Fluids

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Fire is highly destructive in nature and thus commonly used to conceal or destroy evidence at crime scenes. Two of the most common biological fluids found at crime scenes are blood and saliva, both of which have high evidentiary value because they can provide DNA evidence. However, the high temperatures and heat from fire, as well as suppression efforts, can degrade the biological fluids and DNA, posing investigative challenges.

The aim of this study was to determine if distance from fire origin and suppression techniques affected the presumptive and confirmatory testing of blood and saliva. Six simulated fires in three different locations were conducted at the Fire and Emergency Services Training Institute (FESTI) in Mississauga, Ontario, Canada. Samples in the two burn cells and the vehicle were positioned at three increasing distances from the fire origin, and samples in the three burn pits were subjected to water, dry chemical, or foam suppression. The presence of human blood was identified on all burn pit samples and vehicle samples farthest from the fire origin using the phenolphthalein test and ABACard® HemaTrace® test. The presence of saliva was successfully detected on all but two burn pit samples and all vehicle samples farthest from the fire origin using the Phadebas® Press test. Two of twelve samples in the burn cells, positioned farthest from the fire origin, detected the presence of saliva. The presence of blood on burn cell samples could not be confirmed due to the high degree of fire damage and soot accumulation. These results suggest that suppression techniques had a minimal effect on the detection of biological fluids, and closer proximity to fire origin had a negative effect on the detection of biological fluids.

Congratulations Class of 2018!

Rachel Banks

Leanna Calla

Tenecia Baptiste-Carmichael

Ashley Cheung

Autumn Collins

Natalie D'Hollander

Malak Elayas

Mirai Gendi

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