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# Table of Contents

2013 IABPA Officers  
President’s Message  
Abstracts of Papers Presented at the 2013 IABPA Annual Training Conference  
Abstracts of Workshops Presented at the 2013 IABPA Annual Training Conference  
IABPA Distinguished Member Award  
Trent University Student Ph.D. Student Honored with Prestigious Vanier Scholarship  
IABPA 2013 Annual Business Meeting Minutes  
Recent BPA Articles in the Scientific Literature  
Organizational Notices  
Training Opportunities  
Editor’s Corner  
Publication Committee/Associate Editors  
Past Editors of the IABPA News/Journal of Bloodstain Pattern Analysis  
Past Presidents of the IABPA
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President’s Message

That's it 2013, we're nearly done. It's been a good year and the IABPA continues to evolve. Our membership is strong and we're expanding our ability to educate and research. In addition our "International" membership is expanding as we welcome new countries to join us. No doubt the hard work of our Translation Committee has facilitated that.

Congratulations to Paul Kish, our newest Distinguished Member. That designation is not bestowed lightly and Paul is most deserving. He not only demonstrates a day-to-day professionalism but also contributes to Bloodstain Pattern Analysis through his research and education.

Our Education Committee has prepared a draft course standard for the IAPBA “Bloodstain Pattern Analysis Advanced Course”. This document has been available for review for some time. To date the committee has received some comments but now, as they have extended the opportunity, we hope you will contribute as well. The Education Committee is open and receptive to any and all suggestions.

Our website serves as a great source of reference to the IABPA Journal of Bloodstain Pattern Analysis. While you're there have a look around. You can find other members contact information, check on current training opportunities and so much more. Our webmaster (Joe Slemko) has put together our "first on-line voting system". This will make it easier to cast your ballot as well as refresh your memory on our members running for positions on the Executive Board. Please read the instructions carefully, your vote is important.

Plans are progressing well for the 2014 IABPA Training Conference in Portland, Maine. It promises to be a great venue with an excellent program. Mark your calendars and consider your budget, this is one you'll not want to miss.

As the year ends we're getting ready for Christmas and counting our blessings. Thanks to everyone, to all of our members for keeping us active and prepared for the challenges ahead. Celebrate, have a Merry Christmas and a Bloody New Year.

Pat Laturnus
President
IABPA
Abstracts of Papers Presented at the 2013 IABPA Annual Training Conference

Distinctions: Bloodstain Pattern Analysis and Interpretation versus Scene Reconstruction

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Abstract

This presentation is a summation of the differences and similarities between the concepts of scene reconstructions and the descriptive analyses of bloodstain patterns from scenes. Whether civil or criminal, scene reconstructions are performed for the purpose of answering probative questions about the situation being investigated. Indeed, one of the first questions to be answered may be whether this is a civil or criminal investigation. Competent scene reconstructions can only be performed when the reconstructionist has all available information at hand for review and inclusion in the deliberations, regardless of whether they were or were not at the scene. The result should be a reconstruction answering the proposed probative questions that includes all significant evidence (testimonial and physical) and is contrary to none of the exclusionary physical evidence or unexplainable significant differences. If this cannot be accomplished by the review and deliberations, then the result is not exclusionary or exculpatory, but rather inconclusive. The descriptive analyses of bloodstain patterns and mechanisms that create the patterns are performed by competent expert examiners as a sub-discipline of expertise and information required for properly performed scene reconstructions. In a scene reconstruction, ultimately, bloodstain pattern analysis may have no role, may only have some role and be only a part of the evidence, or may be the only physical evidence in the reconstruction. Three brief cases in point will be used to illustrate this concept. At a minimum, in all correctly performed scene reconstructions, the bloodstains must be evaluated as a part of the potential physical evidence available in the information gathering phase of scene reconstructions. The bloodstain pattern examiner must be cognizant of the distinctions between the concepts of scene reconstruction and pattern analysis, and recognize when their examinations have crossed that line from pattern analysis to performing scene reconstructions. The bloodstain pattern analyst may or may not be the same or appropriate expert examiner as the scene reconstructionist depending on one's education, training and experience.
BPA—Experts in Court: "You Can't Say That, or Can You?"

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Abstract

A significant issue in forensic science today is misrepresentation of qualifications, and overreaching on conclusions and opinion without adequate foundation. When a bloodstain pattern analyst hits the courtroom, what can and can’t they say, within the established limits of their expertise and within the limits of bloodstain pattern analysis. With over 18 years as a public defender, supervising attorneys and investigators and working high profile cases, Sloan Ostbye will discuss these current issues in bloodstain pattern analysis and how the bloodstain pattern analyst approaches a bloodstain case, prepares their report, and ultimately gives “expert” testimony. Many “experts” are, or seem unaware that their opinions and conclusions are regulated by the state and federal rules of evidence. The bases for their opinions and conclusions may be restricted or eliminated entirely if a judge is not satisfied with their expertise or their methodology. Attending this session will help you avoid these pitfalls:

• Opinions not based on bloodstain pattern analysis at all
• Opinions based on speculation, or expectation
• Opinions that overstate or amplify the significance of bloodstain pattern analysis
• Use of emotional or biased language
• Opinions outside your expertise and discipline
• Conclusions that are not scientifically substantiated
• Misrepresenting the extent of your qualifications and training
The Development of an Element-Based Method for the Reliable Identification of Bloodstain Patterns

Sarah Cockerton and Ravishka Arthur
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Abstract

This work aimed to develop a novel, element-based approach to the classification of bloodstain patterns. The methodology currently employed by a blood pattern analyst to interpret a bloodstain pattern can be ambiguous and as such creates challenges when trying to articulate the basis for the conclusions made. This is particularly important when the information is relayed in the courtroom. The new methodology is aimed to provide a more objective and easily defined approach to bloodstain pattern interpretation. Firstly, the use of simple, descriptive terminology to describe characteristics of bloodstains was investigated. Then the associations that occurred between groups of single elements within a bloodstain pattern were identified. The overall aim was to provide support for the classification of a particular pattern type and the formation of a novel classification scheme for bloodstain pattern interpretation. This presentation will provide an outline of these findings.
Reliability of Current Methods in BPA

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Abstract

Bloodstain pattern analysis (BPA) can be a valuable and informative tool in crime scene and laboratory investigations. Despite its widespread use, very little research has been conducted to understand how reliable and accurate current BPA methods are. In the current study we aimed to assess the reliability of current pattern recognition methods. Twenty seven experienced BPA experts were asked to classify a series of patterns covering a range of pattern types. All participants were anonymous as the study was a purely a test of current methods. Over 400 individual patterns representing the major bloodstain pattern types were analysed. Patterns varied in the extent of bloodstaining available and the type of substrate that they were presented on. In addition, analysts received a case scenario which provided contextual details. Analysts were provided with a list of possible pattern mechanisms and were required to respond in two parts. Part 1 asked the analyst to identify the one mechanism that best described the target pattern, based on his or her initial thoughts. Part 2 allowed the analyst to choose any number of mechanisms that could account for the target pattern, but this conclusion was what he or she would be prepared to state in court. The results of this unique and comprehensive survey, and the implications for BPA experts, will be presented and discussed.
Quantitative Analysis of High Velocity Bloodstain Patterns

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Abstract

The goal of this study is to establish statistically significant classifications of blood spatter patterns resulting from the interactions between a weapon, suspect and victim. Specifically, a “medium velocity” spatter pattern has traditionally been attributed to blunt force injury, while a “high velocity” pattern has been attributed to a gunshot wound. The differentiation between these classifications, however, has been qualitative and controversial. There are neither supporting statistical data nor are there objective criteria as to what constitutes “consistency” or the associated error rate. In this study, high speed video (at >10,000 frames per second) was used to visualize simulated bloodshedding events. The impact velocity of various blunt instruments, including a bat, crowbar, and hammer, onto blood soaked sponges was varied systematically. Analogous experiments were also performed with different caliber bullets fired with systematically varied distances to the target surface. In each case, the spatter drop size distribution and morphology were digitized and quantified using a series of rigorous metrics, thereby developing a large statistical “library” of spatter patterns. Photographs of the patterns were then assessed by trained analysts in a double-blind fashion, with the goal of providing quantitative error rates and testing objective criteria for the classification of medium and high velocity bloodstain patterns. We obtained two key findings. First, we demonstrate that quantitative metrics involving the spatially-dependent size distribution of droplets within a spatter pattern could serve as an objective means of differentiating gunshot and blunt instrument spatter patterns. Second, our double blind investigation revealed that human assessments yielded low error rates for gunshot spatter patterns (0.2%), but high error rates for blunt instrument spatter patterns (37%). Our findings strongly suggest that (i) great caution should be exercised when identifying a pattern as resulting from a gunshot or blunt instrument impact in the absence of secondary indicia, and (ii) that further effort should be put toward development and refinement of quantitative image analysis procedures based on droplet spatial distributions.
The Use of a Novel Physical Model for Gunshot-Related Blood Spatter Simulation

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Abstract

The study of gunshot-related blood-spatter is a common and often critical task for investigators. Simulating the formation of this spatter to answer case-related questions is difficult. Furthermore the mechanism of spatter projection is not well understood. Because tests on human subjects are not possible; modeling techniques are required. The premise underlying this approach is that, by using anatomically accurate dimensions and the best available simulant materials, a valid human head model will be produced.

The objectives for this study were:

- To find materials that will adequately simulate the relevant anatomical features of the human head
- To construct a physical model that will permit the visualization of intra-cranial dynamics and external spatter formation
- To demonstrate the use of the model for studying critical cranial mechanistic components such as tail splashing and intra-cranial cavitation effects

A model, which is as anatomically as close as possible to an adult human head was built. Every effort was made to ensure the design of the model enables reproducible and economical construction. The model was tested using .22 and 9 mm ammunition. A high speed digital camera was used to measure bullet movement, the deformation of the brain simulant and behaviour of spattered material during controlled shooting experiments. The model was tested to ensure it was able to withstand the perforating impact of the bullet to the same extent as a human head. Partial validation was achieved by comparisons with ballistics tests using pig heads. In the course of testing the model a set of high speed video clips was collected. These demonstrated cranial gunshot wounding and associated spatter formation. Such a model is an important step forward for the scientific simulation of cranial gunshot wounding and associated spatter formation.
Can We Reconstruct the Curved Trajectories of Blood Drops?

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Abstract

One of the main issues in Bloodstain Pattern Analysis (BPA) is to determine where a blood spatter originates from, for the purpose of reconstructing the bloodletting event. This operation involves the backward reconstruction of drop trajectories based on the inspection of the stains and on a model for the flight of drops. Early work by Piotrowski (1895) specify that blood drops do not travel in straight lines, a concept also reflected in the BPA literature by mention of ‘bent trajectories’, ‘ballistic trajectories’ or ‘parabolic trajectories’, to acknowledge the influence of gravity and drag forces. As stated in 1939 in Balthazard et al. “Le problème [of reconstructing trajectories] est très difficile à résoudre”. Indeed, reconstructing trajectories is still very difficult today, as reviewed in Attinger et al., 2013. A first-order approach to reconstruct trajectories is to assume that the droplets travel in straight lines (Kirk 1955): this approach induces systematic errors by neglecting drag and gravity forces (Behrooz 2011). Recently, BPA research has proposed techniques to reconstruct curved trajectories, based on probabilistic or statistical methods. In this talk, we review the state-of-the-art methods to reconstruct curved trajectories. We explain why the determination of impact angles is not sufficient to reconstruct curved trajectories. We also propose a novel direct technique, where 3D inspection of stains is used to obtain information to directly reconstruct curved trajectories.

References:

Study of the Flight Motion of Blood for Bloodstain Pattern Analysis in Forensic Science: Modeling and Experiment

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\begin{figure}[h]
\centering
\includegraphics[width=0.3\textwidth]{RaquelMurray.jpg}
\caption{Raquel Murray}
\end{figure}

\textbf{Abstract}

Forensic Physics is a broad field that covers topics in ballistics, firearms and Bloodstain Pattern Analysis (BPA). BPA focuses on analysing bloodstains found in a crime scene with the view to recreate the events leading to these bloodstains. The objective is to identify the cause of the bloodstain, often referred to as the bloodletting event. The aim of BPA is to trace the stains from individual droplets back to their source. Once a blood droplet exits the body, it travels along a unique trajectory toward the surface it is going to impact. This trajectory resembles a parabolic path and while the droplet is travelling along this path radial contractions or oscillations of the droplet occur. There are many sub-areas for this topic: blood droplet oscillations and equilibrium positions of a droplet during flight, the effect of different surfaces on a bloodstain and the characterization of stains from either firearms or blunt or sharp objects. In this work we present a three dimensional, forward model that includes drag and gravitational forces on blood droplets. The model is used to analyse the drag coefficient, speed proportionality, radius of a droplet, initial speed of a droplet and exit angles of a droplet emerging from a ballistics gel. The experiments use both simulated (or transfer) blood and porcine blood encased in ballistics gel as a target. The target is shot with a riot ball loaded paint ball gun as the cause of the bloodletting event. The non-Newtonian behaviour of the porcine blood is investigated and the oscillations of droplets are considered.
Does the Non-Spherical Shape of a Spatter Drop Affect Its Trajectory?

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Abstract

Violent crimes involving bloodshed may result in the formation of a number of blood drops that move through air and eventually impact onto a surface producing a bloodstain pattern. This is termed blood spatter. If two or more drop trajectories can be determined, from measurements of the stains it leaves, the point at which they cross is the probable location of the victim at the time the wound was inflicted. In order to accurately predict the trajectory of a drop, and therefore its origin, characteristics of drop formation mechanisms as well as all forces acting on a drop and its behavior during flight should be considered. A drop may be non-spherical and experience shape oscillations during flight. This may lead to a significant drop trajectory alteration, which is of importance to the point of origin determination. This study aimed to address these issues by; firstly, examining the possibility that spatter drops experience pronounced deformation during flight. This has been done by analysis of the flight Weber number. Secondly, a numerical code for accurate blood drop flight modeling was developed and validated against a number of analytical and experimental cases, with special attention to the blood drops produced as a result of passive dripping, cast-off and impact. The flight of deformed droplets was studied numerically for typical drop sizes and velocities. The effect of the initial oscillations of passive and cast-off drops on the evolution of flight velocity and distance was found to be negligibly small. The oscillation frequency and damping rate were well described by the theory for small-amplitude oscillation of a low-viscosity liquid drop. The cast-off drops studied possessed low deformation levels altering drop trajectory by less than 5% and 1% for the vertical and horizontal distances traversed respectively, and less than 1% for the velocity at impact. Impact-generated drops were found to be highly distorted in earlier stages of flight. This reduced drop flight range and height by as much as 2 m horizontally and 0.5 m vertically compared to the case of the undisturbed drop flight. Drop deformation, however, was observed to affect drop trajectory considerably only after about 2 m of its flight.
Investigation of Impact Spatter and the Effects of Controlled Independent Variables

Dr. Stanley J. Bajic
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Abstract

This presentation describes a study of the independent variables that determine the size and angular distributions of bloodstains generated by impact of an object into pools of blood. An apparatus has been assembled that allows researchers to control the parameters that affect the mechanism of droplet generation during impact. These parameters are studied by controlling as many of these parameters as possible while varying only one at a time. Impact experiments are recorded using both high speed videography and by collecting stains on a nearby target material. The resulting stains on the target material are scanned, images optimized for high contrast edge detection, and the diameter, area, shape, and locations are measured for thousands of stain from each event using Image J software. The stain patterns are characterized using cumulative area distributions and angular distributions derived from these measurements. Experiments have been conducted to determine the effects of various conditions including depth of the blood pool, edge geometry of the pool, temperature of the blood, animal species, dilution, hematocrit content, and mass of the impacting object. Preliminary fluid dynamic calculations model the mechanism of blood break up into droplets and fit reasonably well with observed high speed video. The presenter will discuss the importance of the observed effects for future research and experimentation in impact spatter.
Man vs. Machine: Combining Blood Fluid Dynamics and 3D Human Biomechanics with Cast-off Pattern Creation and Reconstruction . . . in a Cage

Elisabeth Williams\textsuperscript{1,2}, Michael Taylor\textsuperscript{2}, Eric Huang\textsuperscript{1}, Patrick Geoghegan\textsuperscript{2,3}, Jorge Spinola-Fernandez\textsuperscript{1,5}, Laura Young\textsuperscript{1}, Natalia Kabaliuk\textsuperscript{3}, Therese de Castro\textsuperscript{2,4}, and Sharon Walt\textsuperscript{1}

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Abstract

Cast-off patterns are created when bloodied objects are swung away from and back towards a blood source. This creates characteristic relatively linear or curvilinear trails of similar-sized stains usually resulting from upward-moving blood droplets. The aim of this study was to develop a model to reconstruct weapon trajectory and some physical attributes of assailant and weapon from a cast-off pattern. Two series of experiments were carried out for this study; the first with a controlled mechanical device and the second with a human subject.

The predominant fluid dynamics research in the BPA discipline is focused on falling droplets. There is no existing objective, systematic, quantitative study regarding stains created from upward-propelled droplets compared with downward at a range of impact angles, velocities and sizes. Reconstruction equations developed from falling droplets however are regularly applied to the reconstruction of upward travelling droplet trajectories.

Using a motorized blood droplet generation device comprising of a rotating 600 mm aluminum disc, pig blood with standardised physical properties was used to create blood droplets of a range of sizes, at a number of different velocities and angles on Foamcore\textsuperscript{®} targets.

Droplet trajectories were recorded with a high speed digital video camera using a high-intensity back lighting system. Droplet impacts were recorded with a second high speed video camera and stains were recorded using still photography. Video and stain data were analysed using Matlab\textsuperscript{®} software. Correlations were made between stain presentation and droplet impact conditions for large data sets. Droplet trajectory data has been used to validate a computational ballistic trajectory prediction model.

To validate the mechanical device data for a ‘real world’ application, a 2.4 m high, 3.7 m long cage with removable Foamcore\textsuperscript{®} walls and ceilings was constructed inside a 3D motion capture system.
laboratory. Weapon swinging trials were performed inside the cage by a human subject using three different weapons. Pig blood was applied to each of the weapons in order to create cast-off patterns on the walls and ceilings of the cage.

Each trial was recorded using a 3D motion capture system, three video cameras and still photography. The inside of the cage was recorded using a 3D laser scanner following the trials. The coordinates of the weapon, body, bloodstains and calculated ballistic blood drop trajectories were then integrated into the laser scan. The characteristics of cast-off patterns created with long and short weapons, wide and narrow and high and medium velocities were assessed. This study has determined that a 3D reconstruction of weapon trajectory and some aspects of the human biomechanics are possible from a cast-off pattern with known rates of error under controlled conditions.

Fluid Dynamics Aspects of Bloodstain Pattern Analysis: Comparative Review and Research Opportunities

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Abstract

This review [1] highlights some research opportunities for fluid dynamics (FD) studies related to the discipline of bloodstain pattern analysis (BPA) in forensics. The need for better integrating FD and BPA is mentioned in a 2009 report [2] by the US National Research Council, entitled “Strengthening Forensic Science in the United States: A Path Forward”. The report mentions that “the uncertainties associated with bloodstain pattern analysis are enormous”, states that a minimum requirement to make BPA interpretations is to have “an understanding of the physics of fluid transfer”, and advocates for stronger scientific foundations for BPA, given “the complex nature of fluid dynamics”.

From its infancy in 19th century Germany, BPA has aimed for practical answers to specific questions of the kind: “How did a bloodletting incident happen?” FD, on the other hand, aims to quantitatively describe the transport of fluids and the related causes, with general equations. BPA typically solves the indirect problem of inspecting stains in a crime scene to infer the most probable
bloodletting incident that produced these patterns. FD typically defines the initial and boundary conditions of a fluid system and from there describes how the system evolves in time and space, most often in a deterministic manner. In this talk, we will show that the BPA and FD communities could benefit from a deeper understanding of the other. Specifically, BPA can obtain new quantitative tools and methods, while FD may be presented with new multiphase flow problems.

This review focuses on five aspects of BPA: the physical forces at play, the generation of drops, their flight, their impact and the formation of stains. For each of these five topics, we review relevant literature from the BPA community, and then from the FD communities. We then show the connections between both disciplines, describing how well these multiphase flow problems are understood and what opportunities exist for new research.

References:


Developing BPA in Poland

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Abstract

The development (or rather: introduction) of a new field of forensic science is a lengthy and difficult process. People who are responsible for such a task should have a lot of knowledge, self-discipline and most importantly: patience. Development is not a single task—it is a whole process with several levels and each of them is important. In the Author’s opinion, the essential part in this process is to have the proper plan. Such an approach is very similar to the one that we employ when we deal with a scene of crime: we need to go from the overall picture down to the minute details, from the entrance through the middle of crime scene, ending at backdoors. In our plan we must envision our next steps and foresee the obstacles that we might experience in the future. This presentation will show what is the plan for the introduction of BPA in Poland, which emerging
problems may be the most difficult and how we expect to deal with them. The Author will also present his own progress in BPA and show some simple ideas that might make your BPA opinion even more interesting. The presentation will show basics of SweetHome3D® software which is a great and free tool that we may use to enhance the quality of crime scene reconstruction. Last but not least, the Author will offer his suggestion of changing one of the terms in BPA terminology (blood into blood mechanism). The presentation will demonstrate a simple experiment that will show that this term may be inaccurate and irrelevant in some common, nonspecific conditions.

Estimating the Age of a Bloodstain

Clifton P. Bishop
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Abstract

DNA profiling from a bloodstain discovered at the scene of a crime can link a suspect to that location but cannot provide a temporal link. The bloodstain could have been deposited months before the commission of the crime. The ability to temporally link a bloodstain to the commission of a crime, or demonstrate it was deposited before the commission of a crime, can determine the success of an investigation. For almost a century, attempts have been made to estimate the age of a bloodstain with limited success. In an approach analogous to C14 dating, we have used differences in RNA degradation rates to estimate the age of bloodstains. C14 dating relies upon the time dependent changing ratio of radioactive C14 to stable C12. Upon death, no more C14 is taken up by an organism and as the C14 decays, the ratio of C12 to C14 goes up in a predictable manner. Unfortunately, the half-life of C14 is over 5,000 years and therefore of little value to a forensic scientist. RNA, on the other hand, is an abundant but labile biological molecule that decays in days rather than millenniums. In the results presented here, blood was isolated from 30 different people and spotted onto white cloth and allowed to age. RNA was isolated from the bloodstains and the relative ratios of three different pairs of RNAs were determined using quantitative PCR. One member of each pair remains relatively stable (serving as an internal control like C12 in C14 dating) while the second one decays more rapidly. By combining the decay profiles of the three pairs, we can clearly differentiate between fresh blood, blood that is a week old, blood that is a month old, and blood that is 90 days old (with one exception). The rate of RNA decay is influenced by both humidity and temperature and thus the technique works best on samples collected from stable environments such as an air conditioned building or a basement.
Necessity of BPA in Forensic Medicine Residency Education and Practice

Kemalettin Acar

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Abstract

Bloodstain pattern analysis (BPA) is a very new field in the Turkish forensic system. There are only a few bloodstain pattern analysts in Turkey who have taken standard BPA courses. Obviously, it’ll take a long time for enough people to attend these courses and become experienced BPA experts.

In our country, forensic medical examiners go to crime scene investigations, in addition to performing autopsies in most medicolegal cases. Forensic medicine residency takes four years after medical school. This is a structured period and includes many basic elements, such as forensic pathology, clinical forensic medicine, forensic psychiatry, etc. But right now, there isn’t any component of BPA in this process. So, if we were to provide basic BPA education during forensic medicine residency, forensic medical examiners would be able to apply their BPA skills as needed—they could not only advise other crime scene personnel such as public prosecutors, police officers, and photographers, but could also testify as experts if they wanted, and they could improve themselves by attending standard BPA training courses. We think that they would be able at least to prevent gross mistakes in crime scenes after their residency.

From this point of view, we prepared a questionnaire form and delivered it to 50 forensic medical examiners who were from different areas of Turkey. The form consisted of seventeen questions about the recipient’s experience in: forensic medicine; autopsy and crime scene investigation rates; levels of awareness and knowledge of BPA; thoughts about other crime scene personnel; and opinions about BPA education during residency.

We found that practicing forensic medical examiners didn’t have enough BPA experience and knowledge, but other crime scene personnel didn’t have enough, either. Most of the respondents claimed that law enforcement personnel in CSI units lacked the skills to correctly photograph bloodstain patterns in crime scenes. As a result of this questionnaire, forensic medical examiners accepted that they need to become educated in BPA.
The Interaction of Blood with Fabrics

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Abstract

Blood will diffuse through different fabrics at different rates, resulting in bloodstains that will have a different appearance depending on the fabric type. Slemko (2003) and White (1986) discussed the absorbency of a fabric and related absorbency to the texture, composition and construction of a fabric. This presentation proposes possible mechanisms as to how blood diffuses within different fabric types. Some synthetic fibers, such as polyester, are hydrophobic and will not absorb blood, rather they appear to adsorb blood. 'Absorption' describes a phenomenon where a liquid (i.e. blood) will penetrate the fiber and 'adsorption' describes the phenomenon where a liquid coats a fiber, i.e. it is a surface interaction. Absorption generally applies to fibers with a high ability to absorb moisture, typically natural fibers, and adsorption generally applies to fibers with a low ability to absorb moisture, typically synthetic fibers. Adsorption partly explains why bloodstains will appear diluted and/or distorted on some synthetic fabrics. For synthetic fabrics in particular, adsorption rather than absorption, may significantly affect the resultant appearance of bloodstains. The length, orientation and type of fiber used in individual yarns within a fabric may also influence the diffusion of blood through a fabric. Long filament fibers, typically made from synthetics or silk, allow for greater diffusion of blood through a fabric compared to short staple fibers. Due to capillary action, blood will diffuse between the filament fibers within a yarn, often resulting in bloodstains exhibiting a dilute appearance.
Bloodstain Pattern Analysis for Drip Stains on Bed Sheeting

Prof. Stephen Michielsen
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Raleigh, North Carolina, USA

Abstract

Bloodstain pattern analysis on hard surfaces is a well-developed field based on the physics of a projectile (the blood drop) and fluid mechanics of the liquid drop upon and following impact with the surface. However, the same cannot be said for BPA on textiles. There are hundreds of different types of fabrics with 10's of different fiber types. When a drop of blood lands on a textile, it can move along the surface, but it also wicks into the yarn and fabric. Wicking has a preferred direction based on the fabric and yarn construction; and the extent of wicking depends on the fiber type as well as the yarn and fabric construction. Bloodstain patterns that are observed on fabrics are combinations of the patterns observed on hard surfaces and the wicking patterns of fluids into the specific types of fabric. Woven textiles are also used to filter out particles that are of a size comparable to red blood cells, which provide both a challenge to BPA, but also may provide a new diagnostic tool.

In this presentation, we will present an overview of the most common types of fabrics. The wicking patterns of liquids into bed sheeting will be discussed. Finally, we will show how the fabric structure of bed sheets alters the BPA that would be observed on smooth surfaces. Specific examples of BPA on bed sheeting under known impact conditions will be given.
Using Molecular Biology for Estimating an Extended Postmortem Interval

Clifton P. Bishop  
Stephanie T. Young, Joshua R. Moore, Gerald R. Hobbs, and Clifton P. Bishop  
West Virginia University, Morgantown, West Virginia, USA

Abstract

The ability to accurately determine time since death, or the postmortem interval (PMI), can be vital to the investigation of suspicious deaths. Knowing when a suspicious death occurred can limit the number of potential suspects to those without a viable alibi for the time of the crime. The forensic techniques currently employed to determine PMI, with the exception of forensic entomology, are accurate in their estimations only for a period of hours to almost a week following death. Forensic entomology, requiring expert knowledge of local carrion insects' life cycles, can provide longer time estimates dependent upon environmental conditions. In today’s presentation, we will apply the techniques we developed to estimate the age of a bloodstain, the time-dependent changing ratios of RNAs, to RNA obtained from tooth pulp. Heads were buried in shallow graves, allowed to age, and teeth were collected on predetermined days. We will present evidence that, by incorporating Accumulated Degree Days into our analysis, we can provide a timeframe within which death occurred with 95% confidence. In one of our summer studies, complete skeletization of the heads (and thus departure of carrion insects) occurred at day 28 while our technique could be successfully employed for 84 days, almost tripling the time over which a PMI estimate may be made. Our technique can be used on samples collected anywhere in the world without any specialized knowledge of local insects.
From Liquid Honey to Silicon Colloid Chemistry: Creating and Assessing Synthetic Blood Substitutes Useful to the Forensic Sciences

Theresa Stotesbury\textsuperscript{1}, Dr. Michael Taylor\textsuperscript{2}, Dr. Mark Jermy\textsuperscript{3}, Mike Illes\textsuperscript{1}, Dr. Andrew Vregdenhil\textsuperscript{1}, and Dr. Paul Wilson\textsuperscript{1}

\textsuperscript{1}Trent University, Peterborough, ON, Canada
\textsuperscript{2}Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
\textsuperscript{3}University of Canterbury, Christchurch, Canterbury, New Zealand

Abstract

There is growing interest within the bloodstain pattern analysis (BPA) community in the development of synthetic blood substitutes (SBSs) for use in forensic training and research. SBSs are attractive alternatives to using human and/or animal blood because they are safe, cost-effective and standardized. This presentation will serve as a brief introduction to recent and promising SBS developments. It will include descriptions of the measurements of the properties of human blood, identifications of possible SBSs and the development of robust and reliable assessment protocols for SBSs. Models that compare SBS drip, impact, and transfer stain and pattern characteristics to both blood and water, two very rheologically different fluids, will be presented and discussed. These models can be used to evaluate the performance of a candidate SBS and include measuring and comparing the:

(i) final drip stain diameter,
(ii) number of total observable spines and scallops of a drip stain,
(iii) the calculated and angle of impact of a drip stain,
(iv) number of spatter stains found in the upper regions of an impact pattern and
(v) resolution of a transfer pattern.

Listeners will be exposed to a rigorous protocol that can be applied by forensic investigators to develop safe SBS fluids that will suit their own reconstruction and research needs. Fifty-one natural, commercial and synthetic products have been evaluated and will be briefly discussed. These fluids have provided insights into the chemical and physical requirements a substitute must meet to mimic the bloodstain patterns investigators find at crime scenes. Silicon colloid chemistry is a new and exciting alternative to the mentioned natural and synthetic products. The enhanced chemical and physical control of the substitute’s properties, created primarily through the sol-gel method, is advantageous for robust SBS development. These colloids can be chemically modified to (i) be reactive to both heme and iron specific chemical enhancers (ii) have similar size, solvation and rheological properties of blood and even (iii) have the potential to include stable synthetic DNA molecules.
Standardising Blood Physical Properties: Implications for Precision Bloodstain Pattern Analysis Research

Elisabeth Williams1,2, Ken Morison3, Eric Neumann4, Michael Taylor2, Patrick Geoghegan2,5
1 Department of Sport and Exercise Science, University of Auckland, New Zealand
2 Environmental Science and Research Ltd (ESR), Christchurch, Canterbury, New Zealand
3 Department of Chemical and Process Engineering, University of Canterbury, Christchurch, New Zealand
4 EpiCentre, Massey University College of Veterinary Medicine, Palmerston North, New Zealand
5 Department of Mechanical Engineering, University of Canterbury, Christchurch, New Zealand

Abstract

Bloodstains are created by external forces acting on liquid blood. High precision fluid dynamics experiments are being carried out in bloodstain pattern analysis (BPA) to improve the quality of the science and understanding of the fundamental principles. The behaviour of a fluid in any system is largely dictated by the physical properties of that fluid, particularly viscosity, surface tension and density. As a complex biological fluid, blood rheology has been shown to exhibit the same inherent variability present in any biological system. Rheological differences have been found to affect the physical properties between both individuals of the same species as well as significant differences between species. Factors such as anticoagulant, temperature, the age of the sample and handling procedures have also been found to have significant effects on blood physical properties.

Pig blood is a commonly used human blood substitute in BPA. The limited literature published on pig blood physical properties has revealed a wide range of viscosity values which differ with pig breed, age, anticoagulant used, collection method and testing equipment. This study examined the variability in blood physical properties in one pig population and the effect of different anticoagulant compounds on these properties. A second experiment was performed to examine the sensitivity of bloodstain formation to the blood viscosity differences seen in this population.

Jugular venipuncture samples were taken from 46 genetically similar New Zealand pigs into vacutainers containing ACD, Lithium Heparin and EDTA anticoagulants. Complete blood count, viscosity, density and surface tension tests were performed on these samples. Results showed significant variability in all measured variables, including the blood viscosity of different animals with the same haematocrit and anticoagulant. The anticoagulant used was also found to affect blood properties, mainly due to the diluent effect of ACD.
To assess the sensitivity of stain presentation to viscosity, bloodstains were created under identical conditions using a mechanical device. Blood samples were modified to five different viscosity values ranging from $2 - 6$ mPa\text{s}. All stain images were analysed using Matlab\textregistered{} software with differences in spreading and splashing characteristics observed between stains created with the different blood samples. It was concluded that the variability in blood viscosity seen in one pig population had measurable effects on bloodstain presentation and limited the validity of experimentally derived prediction equations. A blood normalisation procedure was therefore devised to control for this. To ensure the reliability, repeatability and validity of BPA experimental results, blood properties should be measured and reported with a known margin of error.

Experimental Investigation into the Mechanical Properties of Brain Simulants Used for Cranial Gunshot Simulation, and Airflow Ejection during Collapse of the Temporary Cavity

Dr. Patrick H. Geoghegan  
M.S. Lazarjan\textsuperscript{1}, P. H. Geoghegan\textsuperscript{1}, M. C. Jermy\textsuperscript{1}, and M. C. Taylor\textsuperscript{2}

\textsuperscript{1}University of Canterbury, Christchurch, Canterbury, New Zealand  
\textsuperscript{2}Environmental Science and Research Ltd (ESR), Christchurch, Canterbury, New Zealand

Abstract

Back-spattered bloodstain patterns are often important in investigations of cranial gunshot fatalities, particularly where there is doubt whether the death is suicide or homicide. Back-sputter is the projection of blood and tissue back toward the firearm. Three mechanisms are known to cause back-sputter: the interaction of blood with muzzle gases; a momentum effect known as tail-splash, and collapse of the temporary cavity. The exact physical mechanisms are poorly understood. It is difficult to study the internal mechanics in animal experiments as the head is opaque and sample properties vary from animal to animal. Simulant materials offer the possibility of safe, well-controlled experiments. Suitable simulants must be biologically inert, be stable over some reasonable shelf-life, and respond to ballistic penetration in the same way as the corresponding human tissues. For penetrating head wounds, simulants for scalp, skull and brain must be found. In the first part of this talk the ballistic response of gelatine (3, 5 and 10% (w/w)) and a new composite material based on glycerol, starch and fibre are compared to bovine brain. When shot with .22LR and 1.0 gramme diabolo projectiles at $\sim$275m/s, the kinetic energy absorption was similar for all materials tested, suggesting that energy absorption is principally sensitive to density. The expansion rate of the samples was measured during penetration. Gelatine exhibits elastic recoil which is absent in the
bovine brain and the composite material. The brain and composite are more viscous (dissipate energy faster).

The second part of the talk reports a study of the air flow into and out of the temporary cavity as it expands and collapses. This air motion was rendered visible by tracking clouds of particles suspended in the air and illuminated with intense laser light. A block of 5% gelatine was shot with a 1.0 gramme diabolo pellet at ~275m/s. As the cavity first expands the air was observed to move into the entrance wound at approximately 140 m/s. As the cavity collapses, air was ejected from the entrance wound at ~115m/s, with lower velocities found on subsequent rebounds (as the cavity re-opens and re-closes). The ejection of the air through the wound channel with a velocity of ~100m/s may be an important mechanism carrying blood and tissue fragments out of the wound back towards the weapon.

Investigations on the Use of MicroRNA Tissue Markers to Correlate Bloodstains with Wounds

Donald Johnson
California State University
Los Angeles, California, USA

Abstract

The body of a homicide victim is sometimes removed from the primary scene to be deposed of elsewhere. Murders often result in significant bloodshed, which can allow investigators to establish the location of the murder based on bloodstain pattern interpretation and knowledge of the victim’s wounds. However, the circumstances of other homicide cases are such that little blood is shed or discovered by the investigators. Additionally, the suspected murder scene is often a place where the victim is known to have a history of physical activities. The author has encountered situations in casework where blood from the victim was found at the victim’s residence or places of visit, but it was in the form of a non-specific bloodstain pattern and in small quantities. The cause of the bloodshed was not indicated by the blood evidence. Accordingly, the finding of nondescript bloodstains from the victim at places where the victim lives or visits raises questions as to the relationship of the bloodstains to the crime. The bloodstains may have been the result of the homicide or some prior accidental injury sustained by the victim. Furthermore, the circumstances may be such that blood from the victim was found on an item in the suspect’s possession, but the victim and suspect had a history of physical contact, and they likely shared the item in question. Again, the victim’s blood was present on the item as an uninformative pattern, and consequently, the relevance of the bloodstained item to the case was in question. In this proof-of-concept study, a molecular approach was examined to correlate injuries with non-specific bloodstains using the rat as a model. Specifically, investigations were conducted on the rat brain marker, rno-miR-124-3p, with the QIAGEN miScript System and real-time PCR analysis. Rno-miR-124-3p was detected in brain homogenates diluted 100,000 times; in 3 week old, room temperature stored, simulated brain-blood stains; and in bloodstains from head gunshot wounds collected with swabs and subsequently frozen for 9-18 months; however, rno-miR-124-3p was not detected in whole blood. Proof-of-principle was demonstrated by the ability to distinguish bloodstains from a gunshot wound to the head versus bloodstains from a gunshot wound to the chest, by the testing of otherwise identical bloodstains from the two patterns for the presence of the marker.
Body Fluid Identification via Molecular Beacons

Joshua R. Moore, Stephanie T. Young, and Clifton P. Bishop
West Virginia University, Morgantown, West Virginia, USA

Abstract

The identification and collection of evidence at the crime scene is crucial to the success of the investigation. Many presumptive tests for biological fluids can be performed at the crime scene; however, confirmatory tests are generally limited to the laboratory setting. This contributes to the large backlogs of biological evidence in crime labs across the country. A confirmatory test for multiple body fluids that could be performed in the field would allow the field workers to identify the evidence that will be most useful, reducing the number of samples collected and helping to reduce the backlog.

Our method targets body fluid-specific RNAs using fluorescent markers, specifically quantum dot molecular beacons. Since some RNAs are only expressed in certain tissue types, a literature search allowed us to choose target RNAs that are only expressed in our body fluids of interest: blood, saliva, and seminal fluid. We also included an RNA that is human specific, in case of other tissue types. For identification, RNA is combined with quantum dot molecular beacons. These are hairpin-shaped probes that unfold and fluoresce when in contact with their target RNA. The high binding specificity and narrow emission of the quantum dot molecular beacons allows multiplexing of the reaction, reducing the processing time. The reaction can then be analyzed with a portable fluorescence spectrophotometer powered by a laptop, and the body fluid identified based on the fluorescence. This technique provides a time- and cost-effective confirmatory test for body fluids that could be field-usable.
The Psychobiology of Sensory Perceptions: Is there Uncontrolled Perceptive Bias in the Pattern Matching Comparative Sciences?

Lynne D. Herold, Ph.D.
Los Angeles County Sheriff’s Department
Los Angeles, California, USA

Abstract

An introduction to the psychobiological study of human sensory perceptions will be discussed and practically demonstrated (oh boy, group audience participation!) in this presentation. Human sensory perceptions are, in part, genetically controlled and, in part, learned behaviors or the result of environmental exposures. Some human perceptions can be voluntarily controlled and changed, while others cannot be voluntarily controlled or changed. In either situation, that lack of awareness of the factors affecting sensory perceptions can lead to an unintended sensory perception bias. This, in turn, may have obvious and profound effects on the comparative pattern matching sciences. Some of the ways in which this type of potential for bias can be mitigated will also be discussed and practically demonstrated including such things as work place practices, appropriate training, and study matter orientations, size scaling, etc. The goal of this presentation is to provide the audience with:

• an introductory understanding of the biological basis of sensory perceptions
• an introduction to the potential for sensory bias
• practical concepts on ways to mitigate potential bias
• information that can be effectively used to explain concepts of perception and bias and mitigation to the triers of fact or clients.
Context Bias in Bloodstain Pattern Analysis: How Much Information is too Much?

LeeAnn Singley
Grayson Singley Associates, LLC
Duncannon, PA, USA

Abstract

This presentation will explore context bias as it relates to forensic science; and in particular, Bloodstain Pattern Analysis. Context effects are described as the influence of the environment and information on individuals’ perception. In a typical forensic examination, we are often provided background case information from which we design our analytical plan. But how much information is too much? In this presentation, the bloodstain pattern analyst’s regular exposure to various biases will be discussed. In addition, the lecture will bring forth possible mechanisms to assist in lessening these biases and their effects. Scenarios will be provided to the participants to promote discussion on this somewhat controversial topic.

Lifting (Latent) bloodstain with the Use of Alginate

Martin Eversdijk
Loci Forensic Products
Nieuw Vennep, The Netherlands

Abstract

This presentation covers a rather new method for lifting and enhancing blood impressions on dark fabric with the use of alginate. This simple method makes 3D lifts that show bloodtraces beyond the sensitivity of IR. In this lecture, Martin will provide basic information about materials used, methods of application, tips and tricks, and pros and cons. Also, in this presentation Martin will demonstrate an easy technique for visualizing the area of origin when using the tangent technique in 2D and in real 3D, plus a quick look into a newly started investigation into the use of a pesticides additive to chemical enhancement and search solutions.
Platform for Securing and Analyzing Bloodstains at the Crime Scene Using 3D technology—R&D Project

Kamil Januszkiewicz, Emilja Szablowska-Gnap, Joanna Dabrowska, Maria Walczuk, and Malgorzata Kwietniewska
Central Forensic Laboratory of the Police, Warsaw, Poland

Abstract

Despite the fact that one of the first described experiments in the field of BPA was carried out in Poland, the number of experts who are active in this area in our country is very small. This is due to the fact that BPA in Poland is treated as a niche area of forensics. This is also reflected in the lack of uniform guidelines for the preservation and analysis of bloodstains at crime scenes. Due to the small number of experts, only in some cases is it possible for them to undertake examinations at the scene. When the presence of the BPA expert at the crime scene is not possible, the CSI group is responsible for securing all evidence present at the crime scene. Unfortunately, very often material for the BPA reconstruction is secured in a way which does not allow for any analysis. These problems are often the result of the operation of CSI groups which are focused firstly on securing all other forensic evidence.

Therefore, we have tried to develop a complete platform for securing and subsequent evaluation of bloodstains at the scene. The project aims at implementation of the latest achievements in the scope of visualization and reconstruction of 3D objects. This technology supports the recording of crime scene topography and the recreation of exact distances between objects and exhibits present at the scene. This technology will also consist of a bloodstain pattern database in the form of an encyclopedia/dictionary which might be useful for the training of technicians and forensic experts. We hope that this project will also help us to implement the latest achievements in the field of analysis of bloodstains in Polish Criminology. The project is financed by the National Research and Development Centre.
Abstracts of Workshops Presented at the 2013 IABPA Annual Training Conference

Which Sock is Whiter? The Scientific Method and Its Application to Case-Specific Experimentation

Brian Yamashita¹ and Holly Latham²
¹Royal Canadian Mounted Police, Ottawa, Ontario, Canada
²Kansas Bureau of Investigation, Great Bend, Kansas, USA

Abstract

Laundry commercials demonstrate in 30 seconds how to conduct controlled experimentation, keeping all variables equal except the detergent, all to answer the question, “Which sock is whiter”? In contrast to the simple television demonstration, bloodstain pattern scenes are often complex and present the analyst with several questions to be answered. A BPA analyst will need to recognize within the scene what unanswered question(s) there are. Then, like the detergent commercial, the analyst will need to identify and control the variables in order to conduct a valid experiment that will answer the question.

Through the application of the scientific method, BPA examiners analyze the scene to determine possible mechanisms that could have created bloodstains and bloodstain patterns. At times, experimentation must be utilized, which may allow the analyst to accept or eliminate the possibility that a particular mechanism created a bloodstain pattern.

This workshop will explore the scientific method and its application to BPA and experimentation. The instructors will explain how to approach setting up a case-specific experiment and identifying the variables present. Hands-on exercises will involve providing the attendees with bloodstain patterns and associated case information, and then working through how to identify, limit, and keep constant the variables involved in order to set up a relevant and valid experiment.

How do we Reach Conclusions About Pattern Classification in BPA?

Rachel Zajac¹, Michael Taylor², and Niki Osborne³
¹University of Otago
Dunedin, New Zealand
²Institute of Environmental Science and Research (ESR)
Christchurch, New Zealand
³Institute of Environmental Science and Research (ESR)
Christchurch
University of Otago
Dunedin, New Zealand

Abstract

Pattern classification in BPA is a complex process that relies heavily on the training and experience of examiners. In addition to the complexities of the patterns themselves, experts are often presented with an array of contextual information relevant to the case, such as other forensic evidence, medical findings, and eyewitness reports, all of which could play a role in how we reach conclusions about these patterns. Do we understand how we reach decisions about pattern type? What part, if any, does contextual information play in these decisions? How should we ultimately express our opinions?

In this workshop, you will be introduced to some of the basic principles of cognitive psychology as they apply to perception and decision-making. You will then be invited to explore the process of decision-making during pattern recognition, and to consider how contextual information might be integrated appropriately into this process. We will use practical exercises to challenge one another in
our approach to BPA. Finally, we will discuss the merits of a standardized methodology for BPA and consider any changes we feel are appropriate in light of the latest research into cognitive factors in forensic decision-making.

Of What We Are Made (version 2): An Introduction to Basic Human Body Tissues

Lynne D. Herold, Ph.D. Biological Sciences
Los Angeles County Sheriff’s Department
Los Angeles, California, USA

Abstract

This half-day workshop is presented as lecture and practical demonstrative illustrations of the hierarchical division of the living world. This workshop is appropriate for attendees from any of the forensic science disciplines, investigative and/or educational backgrounds—everyone will learn something regardless of education background. Some casework examples illustrating why a bloodstain pattern analyst should consider expanding their knowledge in this scientific discipline know as Histology will begin the presentation. The attendees will then be introduced to the seven basic human body tissues:

- bone
- cartilage
- connective tissue
- epithelium
- nerve
- muscle
- blood

The attendees will then be introduced to the largest human body organ and the system to which it belongs, skin and the integumentary system. The goals of the workshop are to expand the attendees understanding of:

- the recognizable and characteristic form, function, and distinction of the basic plant and/or animal tissues
- the integration and structural relationships among the human body tissues to form other structures, organs and organ systems
- how to preliminarily recognize the basic human body tissues visually, or with moderate magnification, or microscopically
- the human body’s largest organ and most commonly encountered tissues related to applied forensic sciences
- best practices for the collection and preservation of different tissue types, and appropriate documentation of observations
- how the presence of these tissues affects the evaluations and interpretations of actual case materials from the scientific and the legal perspectives
**Forensic Pathology**

Jonathan Lucas, M.D.  
San Diego County Medical Examiner Department  
San Diego, California, USA

**Abstract**

This four-hour workshop will cover a variety of topics relative to forensic pathology that may affect blood patterns encountered at a scene. Topics will include basic forensic pathology concepts such as wound interpretation and characteristics of gunshot wounds (handguns, shotguns, and rifles), sharp force injuries (stab wounds and incised wounds), and blunt force trauma (contusions, abrasions, and lacerations). These various types of injuries will be discussed in the context of human anatomy and location of the body relative to access to vascular structures. The participant will learn the types of changes seen after death and the concepts used in time of death estimation. There will be discussion of the likelihood of physical activity following injuries or the length of time until death or incapacitation. Factors used in estimating wound age and determining wound sequence will also be discussed.

Tips on reading, understanding, and interpreting medical examiner reports and opinions in those reports will be given. A brief discussion of the training and experience required to perform wound interpretation and the concepts involved in giving expert witness testimony will be conducted.

*Attendees at the 2013 IABPA Training Conference in San Diego California*
Paul E. Kish Receives IABPA Distinguished Member Award

Paul E. Kish received the 13th Distinguished Member Award at the IABPA Annual Training Conference San Diego, California. The award is given in recognition of significant service to the discipline of Bloodstain Pattern Analysis and the IABPA.

Mr. Kish is a Forensic Consultant in Corning, NY. He holds a B.S. in Criminal Justice and a M.S. in Education from Elmira College. He has over twenty years of experience as a consulting bloodstain pattern and crime scene reconstruction expert. He has been consulted on homicide cases in 30 states and 7 countries while presenting expert testimony in 22 states, the District of Columbia, and Canada. He is an internationally known lecturer on the subject of bloodstain pattern analysis lecturing throughout the United States, Canada, England, The Netherlands, and Sweden. He has educated over 1000 students from 18 countries during weeklong courses on bloodstain pattern analysis.

Mr. Kish is an author of various articles and textbook chapters on the topic of bloodstain patterns. He has been a member as well as an executive board member of SWGSTAIN (Scientific Working Group on Bloodstain Pattern Analysis Methods) since its inception in 2002. He is the past Editor of the International Association of Bloodstain Analysis IAPBA NEWS and is currently an Associate Editor of the IABPA Journal of Bloodstain Pattern Analysis.

He is currently a Fellow in the American Academy of Forensic Sciences and is a member of the Canadian Society of Forensic Sciences, International Association of Bloodstain Analysts, and the International Association for Identification. He has been the recipient of the American Academy of Forensic Sciences’ General Section Achievement Award as well as their Paul W. Kehres Meritorious Service Award. In 2005, he co-authored, Principles of Bloodstain Pattern Analysis – Theory and Practice which is available through CRC Press.
Trent University Ph.D. Student Honoured with Prestigious Vanier Scholarship

Research in partnership with OPP to create synthetic blood for forensic science

Monday, September 23, 2013, Peterborough

Trent University Materials Science Ph.D. student Theresa Stotesbury will receive a $150,000 scholarship over three years, as a recipient of Canada's most prestigious scholarship for doctoral students – the Vanier Canada Graduate Scholarship, announced today in Quebec City by the Honourable Greg Rickford, minister of State (Science and Technology).

“I consider it a great honour to carry this title,” said Ms. Stotesbury. “A whole new level of research has opened up for me and I appreciate the support of faculty and the top facilities I am gaining access to.” Ms. Stotesbury chose to study forensic science because it is a highly analytical discipline. “I have always loved problem solving and critical thinking,” she said. “It is also a newly developing field and has many research opportunities to participate in.”

An emerging scientist in bloodstain pattern analysis, Ms. Stotesbury will focus her research on the creation of a synthetic blood substitute that could be used by professionals and researchers in the forensic sciences. Ms. Stotesbury is a Ph.D. candidate in the Materials Science Graduate Program. Her project involves an important partnership agreement with the Ontario Provincial Police (OPP).

Ms. Stotesbury is returning to Trent as a Forensic Science B.Sc. (Honours) alumna. She completed her M.Sc. in Forensic Science at the University of Auckland in New Zealand, where she will continue with collaboration for her ongoing research. Her supervisory team here at Trent includes Dr. Andrew Vreugdenhil, director of the Materials Science Graduate program; Dr. Paul Wilson, Canada Research Chair in DNA Profiling, Forensics and Functional Genomics; and Mike Illes, a research associate with the Materials Science Graduate program and retired Ontario Provincial Police Identification Staff Sergeant.

"I am delighted that Theresa is being recognized with the Vanier Award," said Professor Vreugdenhil. “She is a truly outstanding student with respect to her scholarship but also for her leadership within the
Trent community and beyond. I am excited about the interdisciplinary skills she brings to the program and look forward to her very bright future."

The purpose of the research is to create a synthetic blood substitute that will be very useful for research, training, and education purposes. It could be used for crime scene reconstruction, DNA analysis, and bloodstain pattern analysis.

“There is a great need for this because of health and safety concerns about using animal or human blood,” explained Ms. Stotesbury. “Transmission of blood-borne diseases and concerns for biohazard safety exist; and protecting students, employees and researchers is a priority.”

Conducting research with Professor Andrew Vreugdenhil, associate professor of Chemistry and director of the Trent Centre for Materials Research, Ms. Stotesbury is currently working in the lab to mimic the physical characteristics of red blood cells using silicon colloid chemistry.

Research with Professor Paul Wilson will involve adding synthetic DNA to the fluid to tackle its relevant biological components in forensics. The goal is for the artificial blood to behave like real blood chemically, biologically and physiologically.

Another aspect of the study involves working alongside Mike Illes at the local OPP headquarters with a high-speed video camera to look at how bloodstain patterns form, particularly to see what happens when the substance is struck by a weapon. The OPP provides bloodstain analysts on site who provide expertise and benefit from the developments in the research. A custom-built, impact-simulation machine built for the project measures at nine feet tall and is controlled by a computer. “You hit a key, and a stainless steel rod hits a pool of ‘blood’,” explains Ms. Stotesbury. “The video camera captures footage of it, and we analyze its fluid dynamics on the computer.”

Ms. Stotesbury’s relationship with the OPP began in the fourth year of her Honours B.Sc. in Forensic Science at Trent. She created a unique project at that time in collaboration with Chemistry and Forensic Science Departments and the OPP. Upon graduation, Ms. Stotesbury was awarded with the Symons Medal for high overall standing. She was also awarded the Daniel Rahn Memorial Grant which led to her presentation for the International Association of Bloodstain Pattern Analysts.

About the Vanier Scholarship
Vanier Canada scholarship recipients are selected through a rigorous, competitive process. First, potential scholars are nominated by a Canadian university. These nominations are evaluated by selection committees struck by Canada’s three research granting agencies—the Social Sciences and Humanities Research Council of Canada (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Canadian Institutes of Health Research (CIHR). Finally, an international, blue-ribbon selection board then ranks Vanier scholarship recipients and recommends them for funding.

Considered the most important, prestigious and sought-after scholarship for doctoral students, the Vanier is on par with such highly renowned scholarships as the Rhodes scholarships in the United Kingdom and the Fulbright scholarships in the United States.

About Trent University
One of Canada's top universities, Trent was founded on the ideal of collaborative learning that's personal, purposeful and transformative. Consistently recognized nationally for leadership in teaching, research and student satisfaction, Trent attracts excellent students from across the country and around the world. Here, undergraduate and graduate students connect and collaborate with faculty, staff and their peers through diverse communities that span residential colleges, classrooms, disciplines, hands-on research, co-curricular and community-based activities. Across all disciplines, Trent brings critical, integrative thinking to life every day. As the University prepares to celebrate its 50th anniversary in 2014, Trent's unique approach to personal development through supportive, collaborative community engagement is in more demand than ever. Students lead the way by co-creating experiences rooted in dialogue, diverse perspectives and collaboration. In a learning environment that builds life-long passion
for inclusion, leadership and social change, Trent's students, alumni, faculty and staff are engaged
global citizens who are catalysts in developing sustainable solutions to complex issues. Trent's
Peterborough campus boasts award-winning architecture in a breathtaking natural setting on the banks
of the Otonabee River, just 90 minutes from downtown Toronto, while Trent Oshawa delivers a distinct
mix of programming in the GTA.

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OFFICERS IN ATTENDANCE:

Pat Laturnus, President
Donald Schuessler, Vice President Region I
Leah Innocci, Vice President Region II
Anthony Mangione, Region IV
Norman Reeves, Secretary/Treasurer
Jeffrey Scozzafava, Sergeant at Arms
Stuart James, Historian

2 October 2013 10:10AM

President Laturnus called the meeting to order. The first order of business was to request a vote by the membership to approve the nomination of Paul Kish to Distinguished Member. The voting members approved the nomination.

President Laturnus requested a motion to approve the 2012 meeting minutes published in the Journal and available at the 2013 meeting. Celestina Rossi moved that the minutes be approved and Colin Hoare seconded the motion. The motion was approved.

A motion for advancement from applicant to provisional members was moved by Colin Hoare and seconded by Joe Slemko. The motion was approved.

A motion for those members who made application from provisional to full member was made by Trevor McLeod and seconded by Jim Killeen. The motion was approved.

President Laturnus discussed the President’s report. Webmaster guidelines created by the Executive Board and the progress of the website under the guidance of Joe Slemko was discussed.

President Laturnus discussed the Executive Board’s decision to move to online voting for the annual Executive Board officer’s election. Current full members will have access to the ballot online and may cast a vote prior to December 31st. Three people including the Webmaster will count the votes. Final results will be passed along to the secretary for publication. President Laturnus discussed the Executive Board’s approval to teleconference as needed.

Vice President Don Schuessler, Region 1, reported that he had 13 membership applications and 1 request for promotion. Vice President Leah Innocci, Region 2, processed applications during the year. The Rocky Mountain Bloodstain Association has a website you may visit for more information. President Laturnus commented that Rex Sparks, Vice President Region 3, was undergoing surgery and was unable to make the meeting. Vice President Anthony Mangione, Region 4, 35 applicants for membership were processed, 12 for full membership and 3 associate memberships. Thanks were given for allowing him to represent region 4 and interact with the members.

President Laturnus read Peter Lambs region 5 report since he was unable to attend this year’s meeting. This is Peter’s last year as Vice President and he commented about the European IABPA conference in Scotland in 2012. Comments were made about the 2015 European IABPA conference and the work of the translation committee. President Laturnus read Brett McCance’s region 6 report since he was unable to attend the meeting. There was a 20% increase in membership reported with 52 total members currently for region 6. Training and education continues in region 6.

Jeff Scozzafava, Sergeant at Arms, had nothing to report and a description of his duties of maintaining order at the meetings was described.

Norm Reeves, Secretary/Treasurer, reported that total income for 2013, as of September was $77,000 with expenses of $53,000. The net worth of the IABPA is $170,000. An explanation of the meaning of Non Profit as it relates to the IRS classification and the need to in fact make a profit to stay viable as any business.
Stuart James, Historian/Publication Committee, pointed out the 3 charter members are present at the meeting, Stuart James, Don Scheussler, and Norm Reeves. A discussion of the IABPA Journal ensued and contributions of articles and photographs are needed for the Journal. Older Journals are available on the member’s area of the website.

Membership Committee:

Norm Reeves, chairman, reported a total of 134 applications processed by himself and the Vice Presidents. As of September there were 842 application/dues paying members.

Ethics Committee:

President Laturnus reported the Chairman is Rex Sparks who is not present and the committee is currently working on one issue. A previous event from 2012 has been settled.

Awards Committee:

Chairman Todd Thorne was not present and there were no nominations.

Translation Committee:

Philippe Esperanca, chairman, reported there are ongoing translations for 36 countries. Translators are needed and someone is needed from India.

SWGSTAIN Committee:

Chairman Gannett had nothing to report

Webmaster Report:

$82,000.00 was processed in fees and registrations. The website cost per month is a reasonable $110.00 per month. There are 663 registered members on the site. 89% of the members are registered from 21 countries. You can search by regions and old Journals are fully searchable. There are requests for information and member information is not disseminated. Online voting is now set up and member numbers are only used to control who votes and does not keep track of who is voted for. A mobile app may be designed for the website if there is enough interest.

Dan Rahn Grant Committee:

Norm Reeves reports a delay with the 2012 grant and no new grants were requested for 2013.

By-Laws Committee:

President Laturnus indicated that the Chairman is Mark Reynolds. By-law changes have been posted on the website for review as well as at the conference. **A by-law change is proposed for the education committee’s review of courses.**

No discussion. A motion by Joe Slemko to accept the by-law change is made and seconded by Ted Silenieks. The motion was approved. **The by-law change expediting the application process was discussed.** A motion to accept this by-law proposal Scott Collings made a motion to accept and Colin Hoare seconded it. The motion was approved. **The by-law for the term of Immediate Past President** was reviewed by the Executive Board at the 2013 Executive Board meeting. A discussion was made describing the by-law. The Executive Board decided based on the 2011 by-laws, that the election of a President in the second year of a Presidency was appropriate and the by-law was tabled for additional consideration. **The by-law proposal regarding the notice of the Annual Meeting**
and location. A motion by Celestina Rossi to accept the by-law change and was seconded by Lisa DiMeo. The motion was approved. The by-law regarding Executive Board meetings by technological media. Motion by Sue Ann Derkatch to accept and seconded by Scott Collings. The motion was approved.

The by-law regarding the election of officers and submission of ballots has faulty wording regarding when the ballots are to be returned. This by-law is tabled to amend the wording. Permission is requested of the membership to allow online voting this year. A motion by Scott Collings to approve online voting this year and was seconded by Lisa DiMeo. The motion was carried.

Education Committee:

Leah Innocci, Chairman, stated the committee has been reviewing all basic and advanced courses from prior years and current submissions for approval. It is hoped that the project will be completed by the end of the year. An advanced course proposal has been emailed for review. LeeAnn Singley indicated she did not receive the email as others may have not. Joe Slemko indicated that some agencies block emails etc. In light of the emails not reaching everyone Leah requested a vote be postponed. There was a discussion regarding the advanced course guidelines.

Certification Committee:

Donald Scheussler, Chairman, reported that some committee’s members have been lost and some new members added. There is a discussion about the two-tier process, one academic and one practical. There is a proposal for IABPA to join forces with the process. A discussion with Pat Laturnus, Jeff Gurvis, Don Scheussler, Michael Gaynor, Paul Kish, Anthony Mangione, and Grif Griffin ensued. Don Scheussler stated that this is a monumental process that may take some more time.

Nominations:

President Laturnus put forth the Executive Board’s nomination committee recommendations with encouragement of other nominations being put forth from the members.

Pat Laturnus - President.
Don Scheussler - VP Region1
Richard Tewes - VP Region 2
DeWayne Morris - VP Region 3
Erin Sims - VP Region 3
Celestina Rossi - VP Region 3
Anthony Mangione - VP Region 4
Mikle van der Sheer - VP Region 5
Ted Silenieks - VP Region 6
Norm Reeves - Secretary
Norm Reeves - Treasurer
Jeff Scozzafava - Sergeant at Arms
Stuart James - Historian

President Laturnus made a call to the floor for any other nominations to these positions. He requested nominations for President from the floor. With no additional nominations, Rob Hoffstetter moved the nomination be closed and seconded by Scott Collings. Motion approved.

President Laturnus requested nominations for VP Region 1 from the floor. With no additional nominations, Paul Kish moved the nomination be closed and seconded by DeWayne Morris. Motion approved.
President Laturnus requested nominations for VP Region 2 from the floor. With no additional nominations, Mark Reynolds moved the nomination be closed seconded by Sue Ann Derkach. Motion approved.

President Laturnus requested nominations for VP Region 3 from the floor. With no additional nominations, Paul Kish moved the nominations be closed seconded by Scott Collings. Motion approved.

President Laturnus requested nominations for VP Region 4 from the floor. With no additional nominations, Rob Hofstetter moved the nomination be closed seconded by Colin Hoare. Motion approved.

President Laturnus requested nominations for VP Region 5 from the floor. LeeAnn Singley nominated Martin Eversdijk seconded by Paul Kish. No additional nominations were made. Gillian Leak moved the nominations be closed seconded by DeWayne Morris. Motion approved.

President Laturnus requested nominations for Secretary from the floor. With no additional nominations, Colin Hoare moved nominations be closed seconded by Lisa DiMeo. Motion approved.

President Laturnus requested nominations for Treasurer from the floor. With no additional nominations, Colin Hoare moved nominations be closed seconded by Scott Collings. Motion approved.

President Laturnus requested nominations for Sergeant at Arms from the floor. With no additional nominations, Larry Renner moved nominations be closed seconded by Gillian Leak. Motion approved.

President Laturnus requested nominations for Historian from the floor. With no additional nominations, Colin Hoare moved nominations be closed seconded by Lisa DiMeo.

Old Business:

There was no old business reported.

New Business:

Mark Reynolds proposed to fund the President or a delegate to a forensic science conference to promote the IABPA and bloodstain pattern analysis. The Executive Board was made aware of Mark’s proposal through Bret McCance and the Executive Board has discussed the ramifications of the proposal. The Executive Board supported the idea and there is a budget to support the proposal. Registration, travel and per diem expenses would be covered up to $5000.00 and if the expenses are less the amount would not exceed the expense. LeeAnn Singley discussed the application process. The Executive Board will process the requests. Paul Kish discussed the procedure for submission of papers to most organizations is a lengthy process. Mark Reynolds made a motion the IABPA may fund the President and a delegate to a forensic science meeting in order to promote the goals of the IABPA. Seconded by LeeAnn Singley. Motion approved.

Adjournment: 11:50AM

Colin Hoare made a motion to close the business meeting. Seconded by Dwayne Morris. The motion was approved.
Recent BPA Related Articles in the Scientific Literature


Organizational Notices

Moving Soon?

All changes of mailing address need to be supplied to our Secretary Norman Reeves. Each quarter Norman forwards completed address labels for those who are members. Do not send change of address information to the Journal Editor. E-mail your new address to Norman Reeves at:

norman@bloody1.com
Norman Reeves
I.A.B.P.A.
12139 E. Makohoh Trail
Tucson, Arizona 85749-8179
Fax: 520-760-5590

Membership Applications / Request for Promotion

Applications for membership as well as for promotion are available on the IABPA website:
IABPA Website: http://www.iabpa.org

The fees for application of membership and yearly dues are $40.00 US each. If you have not received a dues invoice for 2014 please contact Norman Reeves at norman@bloody1.com. Also, apparently, non US credit cards are charging a fee above and beyond the $40.00 membership/application fee. Your credit card is charged only $40.00 US by the IABPA. Any additional fees are imposed by the credit card companies.

IABPA now accepts the following credit cards:

Discover  MasterCard
American Express  Visa

If you had had a change of address, please contact Norman.
Training Opportunities

February 3-7, 2014

Basic Bloodstain Analysis Course
Loci Forensics B.V.
Flierveld 59
2151 LE Nieuw-Vennep
The Netherlands

Instructors: Martin Eversdijk and Rene Gelderman
Fax: +31(0)20-8907749
E-mail: info@lociforensics.nl

February 17-21, 2014

Math and Physics of Bloodstain Pattern Analysis Workshop
Specialized Training Unit
Miami-Dade Public Safety Training Institute
Doral, Florida

Contact: Officer Rosa Holt
Specialized Training Unit
Miami-Dade Public Safety Training Institute
9106 NW 58th Street
Doral, Florida 33178
Tel: 305-715-5022
Fax: 305-715-5107
E-mail: rholtz@mdpd.com

April 7-11, 2014

Basic Bloodstain Pattern Analysis Course
Keiser University
Tampa, Florida

Instructors: Stuart H. James and Anna Cox
Contact: Anna Cox
E-mail: coxforensic@hotmail.com
Tel: 813-732-4001
or
Stuart H. James
E-mail: jamesforen@aol.com
Tel: 954-651-2865
April 14-18, 2014

Advanced Bloodstain Pattern Analysis Course
Loci Forensics B.V.
Flierveld 59
2151 LE Nieuw-Vennep
The Netherlands

Instructors: Martin Eversdijk and Rene Gelderman
Fax: +31(0)20-8907749
E-mail: Info@lociforensics.nl

May 19-23, 2014

Visualization of Latent Bloodstain Course
Loci Forensics B.V.
Flierveld 59
2151 LE Nieuw-Vennep
The Netherlands

Instructors: Martin Eversdijk and Rene Gelderman
Fax: +31(0)20-8907749
E-mail: Info@lociforensics.nl

June 9-13, 2014

The Fabrics of Bloodstain Course
Loci Forensics B.V.
Flierveld 59
2151 LE Nieuw-Vennep
The Netherlands

Instructors: Mark Reynolds and Ted Silenieks (Australia)
Fax: +31(0)20-8907749
E-mail: Info@lociforensics.nl

December 8-12, 2014

Bloodstain Pattern Analysis Workshop
Miami-Dade Public Safety Training Institute
Doral, Florida

Instructor: Toby Wolson, M.S., F-ABC
Miami-Dade Police Department
Crime Laboratory Bureau
Forensic Biology Section
9105 N.W. 25th Street
Doral, Florida
33172-1500
Voice: 305-471-3014
Fax: 305-471-3478
E-mail: twolson@mdpd.com

Articles and training announcements for the March 2014 issue of the Journal of Bloodstain Pattern Analysis must be received before February 15th, 2014
Editor’s Corner

The 2013 IABPA Annual Training Conference held in October was a great success due to the hard work of Carolyn Gannett and Lisa DiMeo. There were 162 registered attendees with representation from the USA, Canada, Australia, England, France, New Zealand, Poland, Taiwan, The Philippines, The Netherlands, Turkey and the United Arab Republic.

On behalf of the membership, I congratulate Paul E. Kish for receiving the 13th Distinguished Member Award from the IABPA. I have known Paul for many years have always appreciated his dedication and expertise in casework and instructing basic and advanced BPA courses throughout the United States and abroad.

As you are aware, this is the third and final issue of our Journal for 2013. Due to lack of articles for publication, I had to combine the September and December issues for publication. The conference abstracts and speaker photographs comprise most of this issue and will provide those members not in attendance, a view of the broad spectrum of scientific presentations and workshops presented. I am anticipating that the March 2014 issue will contain some peer reviewed articles for publications. I am always searching for ways to encourage submission of research papers and case reports. I am always open for new ideas from the membership. Please contact me at any time.

Stuart H. James
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