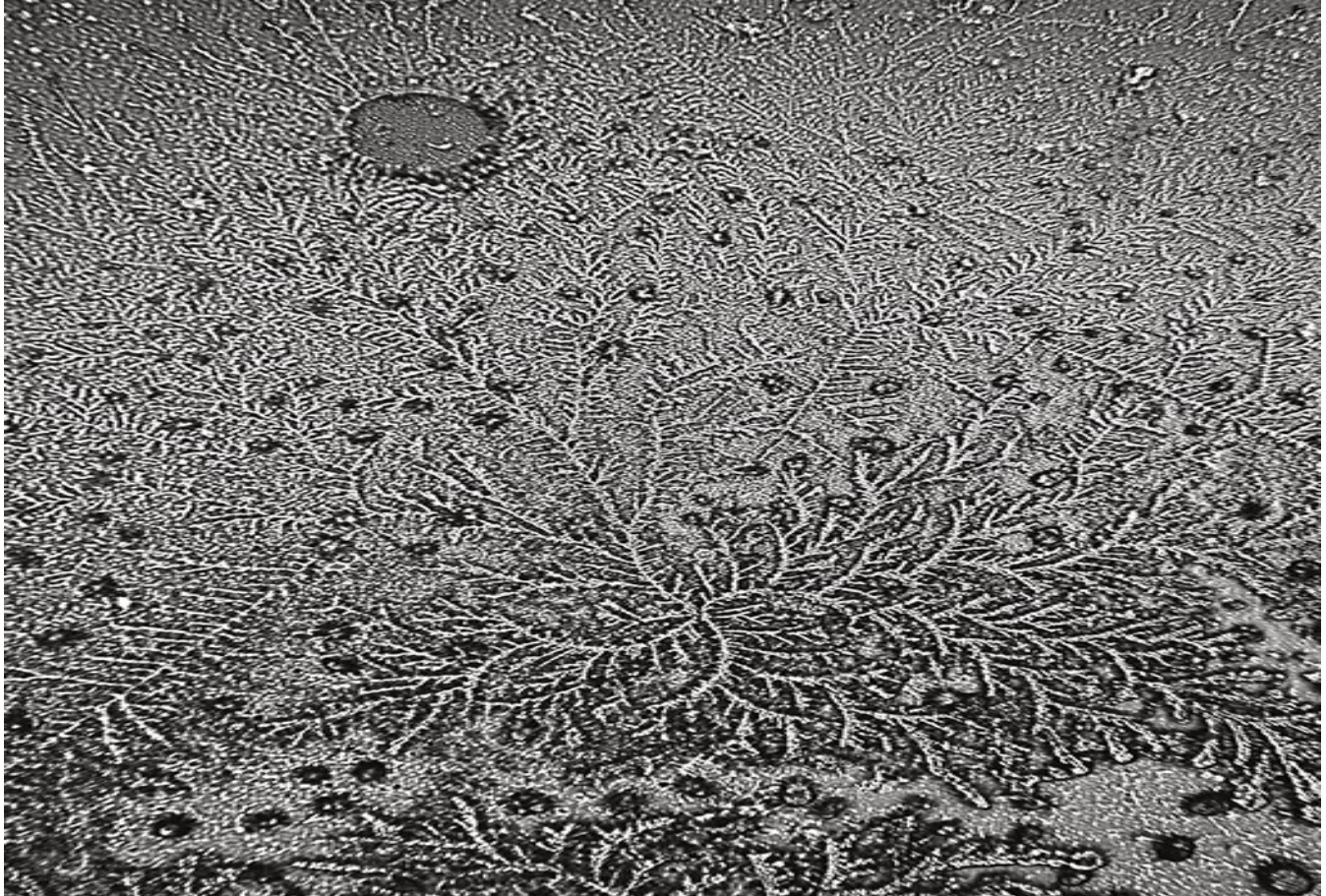


THE IDENTIFIER

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SCIAI Winter Issue

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LETTER FROM OUR PRESIDENT

Happy 2021! I hope your new year is off to a great start!

It goes without saying 2020 was a challenge to everyone. When I was sworn in as President I had no idea that I would have such an extended term. None of us wanted to cancel the Spring Conference last year. We had an exciting line up of speakers and were all very disappointed not to be able to present it to you. On the bright side, many of the scheduled speakers have agreed to come this year!

With an eye on the COVID numbers and the availability of the vaccine, we have made the decision to move this year's conference to August 26th - 27th. We will still be at the Columbia Metropolitan Convention Center. We will have one day devoted to Crime Scene-related presentations and the other devoted to Latent Print-related presentations. Schedules will be coming out as we are able to confirm all of our presenters. Please let me know if you would like to be a presenter or have someone or a topic you'd love to see.

This year we will need to elect several new officers. Currently, we will definitely need a new President, Vice-President, Treasurer, and Secretary. I encourage you to be a part of this if you can. During my time as an officer, I have made great contacts who have become friends. It's a great way to network with other Forensic professionals in South Carolina. You will also receive credits toward IAI certifications and re-certifications. Please let me know if you are interested or have any questions.

Trish



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IN THE NEWS

Assessment of Stress, Burnout, and Resilience in Crime Scene Investigators

by Brittany Plombon, M.S., Caroline Haskamp, B.S., Bailee Schuhmann, M.S., Teresa Bryant, M.S., Vincent Van Hasselt, Ph.D., & Ryan Black, Ph.D. NSU Florida Nova Southeastern University

Crime Scene Investigators are an integral part of law enforcement. After arriving to the scene, CSIs are responsible for identifying and analyzing useful evidence such as fingerprints, hairs, or fibers for later analysis. CSIs encounter explicit, violent scenes of death and are required to examine, smell, and touch the body, bodily fluids, and body parts (Pavsic Mrevlje, 2016). CSIs experience a variety of stressors; duty related stressors include: shift work, on call pressure working long and irregular hours, confrontation with human suffering, decision making dilemmas and doubts at the crime scene, and dirty and physically demanding circumstances at the crime scene. Moreover, CSIs are consistently exposed to traumatic situations in which they tend to use maladaptive coping strategies.

There are indications of higher risk for mental health problems from working on crime scenes. CSIs are responsible for examining crime scenes, deaths, and their critical contents. Members of crime scene units observe death much more frequently than police officers and they encounter extremely graphic and grotesque sensory and mental images (Roth & Vivona, 2010). Factors with the greatest influence on CSIs development of post traumatic stress consist of exposure to death, anxiety, years as an investigator, personality type, emotional intelligence, fatigue, and homicide experience (Yoo, Cho, Cha., & Boo, 2013).

Job burnout in CSIs has been associated with emotional exhaustion, depersonalization, and reduced personal accomplishment from prolonged exposure to operational and organizational stressors (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Kop et al., 1999). Burnout is associated with inefficiency, an increase in workplace-related accidents, absenteeism, substance abuse, early retirement and, in some instances, premature death through physical health problems (Brown & Campbell, 1990).

(continued on page 4)

Assessment of Stress, Burnout, and Resilience in Crime Scene Investigators (*continued from page 3*)

Due to the nature of CSIs work it is reasonable to expect that the cumulative impact of crime scene exposure may lead to harmful psychological effects, such as burnout and fatigue (Hyman, 2004; Kelty & Gordon, 2015; Pavsic Mrevlje, 2016). And, because of the repetitive exposure and disturbance of crime scene, burnout may pose a safety concern for the CSI and their coworkers.

The purpose of this study was to identify whether select positive personal variables (i.e., optimism, social support) are associated with increased resilience. By identifying specific individual characteristics that increase resilience and protect crime scene investigators against job burnout, it is expected that more efficacious approaches can be identified to enhance stress reduction and stress management. The study found that optimism and social support predicted resiliency after accounting for all other predictors. The findings represent a step towards better understanding the underlying mechanisms contributing to resiliency in CSIs. This study highlights the importance of positive personal variables (i.e., hope, optimism, social support) for CSIs to increase their resiliency. The findings confirmed the extensive literature identifying personal variables as resilience promoting factors (Fang et al., 2015; Frappell-Cooke et al. 2010, Reivich & Seligman, 2011; Rushton et al., 2015). As this was a preliminary study, future research by the authors plan to: (a) identify whether years of experience correlated with increased resilience and less stress as moderated by age; (b) determine the extent to which individual resilience acts as a protective factor against job burnout; (c) ascertain whether resilience serves as a significant mediator between hope, optimism, social support, and reduced burnout; and (d) utilize the findings to make suggestions for future interventions and research in this area. A key limitation worth noting is the study was cross sectional in nature as data was collected through a one-time survey.

Detection of Latent Bloodstains Covered with Three Types of Current Top-Selling Paint/Primer Mixtures Using BlueStar

Catia Dombaxe; Mark Vecellio, MFS, MPA, Lisa Kasamba; Devin Walker, BS
Department of Applied Forensic Science, Methodist University, Fayetteville, NC 28311

This article will promote a better understanding of the capabilities of BlueStar in presumptively detecting presence of human blood under one to nine layers of three commonly sold paint/primer combinations.

BlueStar is commonly employed by investigators and is widely viewed as an effective search reagent because of its effectiveness in detecting latent bloodstains and ease of use.

Approximately .05mL of undiluted human blood was put on 1/2" drywall samples and allowed to air dry for a minimum of 24 hours. Four drywall samples were each painted with between one and nine layers of three commonly sold paints within the United States.

- 1) Antique White Colorplace Ultra interior paint plus primer;
- 2) Warm Caramel Glidden interior paint plus primer;
- 3) White Flat Glidden interior paint plus primer.

Each layer of paint was allowed to air dry before the next layer was applied. BlueStar was then applied to the sample in an effort to determine if chemiluminescence could be observed. Results were photographed using a Nikon D5200 DSLR camera.

Chemiluminescence was observed in 96% of the drywall samples (104 of 108). The intensity of the chemiluminescence based on subjective visualization was rated as medium or high in all samples with three or fewer coats of the paints. A gradual decrease in intensity was observed as additional layers of paint were applied. The duration of chemiluminescence ranged from five seconds to greater than thirty seconds.

The duration was greater than 30 seconds for all samples with four or fewer layers of paint. Significant decreases in duration were observed across all paint types with eight and nine layers of paint.

The results of this study illustrate that BlueStar is an effective search reagent when human blood is concealed under one to nine layers of paint primer combinations. Because of the diminishing intensity and duration of chemiluminescence resulting from several layers of paint, our recommendations include using reagent in total darkness and ensuring time to allow eyesight to adapt to the dark environment. Photographic equipment should be pre-set to allow ample time to photograph the chemiluminescence.

Evidence Management

In 2004, Congress passed the Justice for All Act (Public Law 108-405; 118 Stat. 2278), which authorized the government to establish best practices for the preservation of biological evidence. In 2016, Congress reauthorized this law and directed the National Institute of Justice (NIJ) to establish and implement best practices for evidence retention. www.govinfo.gov/content/BILLS-114s2577enr/pdf/BILLS-114s2577enr.pdf.

NIJ partnered with NIST to oversee these activities and established a diverse Evidence Management Steering committee in March 2018 to provide subject matter expertise. As a result of these efforts, an Evidence Management Conference was hosted at NIST October 2-4, 2019 and covered a range of topics related to evidence management and preservation. The National Survey of Evidence Handlers was created and should be published the end of this month to provide data to assess the extent of problems in evidence management and help direct future resources.

NIST Forensic Science

The NIST Forensic Science Research Program recently added a Biometrics focus area to its portfolio. The Biometrics focus area will initially concentrate on fingerprint related topics but may expand to other modalities. The first proposed project involves the evaluation of latent friction ridge technology. A goal of this project is to collect insights toward the creation of an automated scalar quality value for latent prints that will assist with initial value assessments, reduce potential errors, improve efficiency in the evidence lifecycle, and guide reliability in decision making. The second effort will focus on the assessment of close non-matched fingerprints. Using existing research databases, high scoring non-matched prints/exemplars will be used to create a training set that will be used to investigate and ultimately reduce erroneous decisions in these cases. The goal of the final project is to create an open source, high quality, annotated ground truth research data set that can be used to create training material, assess the robustness of interoperable features, and increase the accuracy of models.

Studies

Bullet Black Box Study

NIST and Noblis, an organization that focuses on science, technology, and strategy for providing advisory and support services, are partnering to evaluate the accuracy, repeatability, and reproducibility of bullet comparisons by firearms examiners. This Black Box study will involve conducting 100 physical comparisons of realistic, case scenario-like bullets over a 6-month period (10 sets containing 10 samples).

What Fingerprints, Snowflakes, Brains and Tears Have In Common

by Kate Larsen

Have you had a good cry lately? Maybe shed a tear or two?

Years ago, I heard that tears have varying chemicals based on what generated the tears. Being the curious creature I am, I researched exactly what was different and why. I hope you find the information as fascinating as I did.

Tears are scientifically divided into three different types, based upon their origin. The empirical nature of tears is a chemistry of water, proteins, minerals, hormones and enzymes. It's incredible that tears prompted by strong emotion (vs. cutting an onion or getting dust in your eye) contain protein-based hormones including the neurotransmitter leucine enkephalin, a natural painkiller that is released when the body is under stress.

The credit for this insight goes to a photographer named Rose-Lynn Fisher, who during a tumultuous time in her life wondered if her tears of sadness and frustration were different than her tears of joy and happiness. This led to her study of 100 dried human tears studied through a stand light microscope, called [The Topography of Tears](#). Her photographs of various tears are incredibly sharp and description of her insights poetic. As she says, "The random compositions I find in magnified tears often evoke a sense of place, like aerial views of emotional terrain."

Fisher photographed and saw highly unique characteristics of tears prompted by grief, change, onions, laughing until crying, remembrance, timeless reunion, momentum, release, possibility and hope.

So what do fingerprints, snowflakes, brains and tears have in common? There are no two alike. Each are unique, just like you and me.

<http://katelarsen.com/fingerprints-snowflakes-brains-tears-common/>

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