THANK YOU TO OUR SUPPORTERS!

LOCAL AGENCIES:
San Diego Police Department Forensic Science Section – equipment loan
Los Angeles County Sheriff’s Department, Scientific Services Bureau – program printing
San Diego County Sheriff’s Department Regional Crime Laboratory – equipment loan

VENDORS:
Foster + Freeman .......................... www.fosterfreeman.com  David Tobin ........ David.Tobin@fosterfreeman.com
FoxFury Lighting Solutions .............. www.foxfury.com  Antonio Cugini ............ Antonio@foxfury.com
Lynn Peavey Company .................... www.lynnpeavey.com  Todd Thorne ............... LPV@peaveycorp.com
Photron High Speed Cameras ............ www.photron.com  Andrew Bridges ........... ABridges@photron.com

DOOR PRIZES:
Arcana Forensic Services ................................................................. www.arcanaforensics.com
Arrowhead Forensics .......................... www.crime-scene.com
Bone Clones ................................................................. www.boneclones.com
Evident Crime Scene ............................................................. www.evidentcrimescene.com
Fitzco ................................................................. www.fitzcoinc.com
Foray Technologies ............................................................... www.foray.com
Pelican Products, Inc. .......................... www.pelican.com
Photron High Speed Cameras .................................................. www.photron.com
Taylor & Francis/CRC Press .......................... www.taylorandfrancis.com
TriTech Forensics ............................................................. tritechforensics.com
Wiley Publishing ............................................................. www.wiley.com

ADS:
Abacus Diagnostics ................................................................. www.abacusdiagnostics.com
Foster + Freeman ................................................................. www.fosterfreeman.com

INSERTS:
Forensic Magazine ................................................................. www.forensicmag.com
Taylor & Francis/CRC Press .......................... www.taylorandfrancis.com
TriTech Forensics ............................................................. tritechforensics.com

STAFF:
Carolyn Gannett – Co-host; Presentations Coordinator; graphics; public relations; program design;
   Guidebook Administrator
Lisa Allyn DiMeo – Co-host; Vendor Coordinator; Door Prizes Coordinator; Director of Outsourced Nutriment;
   Book Table Coordinator
Lynne D. Herold – Advisor; International Flair Fair Administrator; printing and photocopying
Sean Soriano – Audio-Visual guru
Steve Cordes – Audio-Visual guru, too
Stuart H. James – Bring Your Own Case (BYOC) Coordinator
Sue Ann Derkach – Registration desk administrator; Timekeeper
Dave Garber – Photographer
Michael Taylor – Coordinator of New Zealand Presentations
Pat Laturnus – Hospitality Room Monitor

A special “thank you” goes to Mike Illes for providing a long list of contacts for potential presenters.

AND LAST BUT NOT LEAST, THE CROWN PLAZA HOTEL, SAN DIEGO:
Steve Hanger, Cami Beck, and the rest of the outstanding Crowne Plaza team.
# TABLE OF CONTENTS

**CONFERENCE SITE MAP** .................................................................................................................................................. 4

**SCHEDULES**

<table>
<thead>
<tr>
<th>Day</th>
<th>Morning</th>
<th>Afternoon</th>
<th>Tuesday Afternoon</th>
<th>Wednesday</th>
<th>Thursday Morning</th>
<th>Thursday Afternoon</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuesday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL SESSION ABSTRACTS** ........................................................................................................................................ 13-41

**WORKSHOP ABSTRACTS** .................................................................................................................................................. 42-45

- *Which Sock is Whiter? The Scientific Method and Its Application to Case-Specific Experimentation*
  
  Brian Yamashita and Holly Latham
  Two offerings of this four-hour workshop: Wed. and Thurs., 1-5 PM ......................................................... 42

- *How do we reach conclusions about pattern classification in BPA?*
  
  Drs. Michael Taylor, Rachel Zajac, and Niki Osborne
  Two offerings of this four-hour workshop: Wed. and Thurs., 1-5 PM ................................................................. 43

- *Of What We Are Made (version 2): An Introduction to Basic Human Body Tissues*
  
  Lynne D. Herold, Ph.D. Biological Sciences
  One offering of this four-hour workshop: Wednesday, 1-5 PM .................................................................................. 44

- *Forensic Pathology*
  
  Jonathan Lucas, M.D.
  One offering of this four-hour workshop: Thursday, 1-5 PM ................................................................................. 45

**BLANK NOTE PAGES** ...................................................................................................................................................... End of Program

**CERTIFICATES WILL BE EMAILED TO ATTENDEES AFTER THE CONFERENCE**

---

MEXICO TRAVEL WARNING: Check [http://travel.state.gov](http://travel.state.gov) for the most up-to-date travel warnings before considering a visit to Mexico. A link to a recent (07-12-13) warning can be found in the conference Guidebook under “Links” and on the IABPA conference web page [www.iabpa.org/2013-training-conference](http://www.iabpa.org/2013-training-conference).
## WEEK AT A GLANCE

<table>
<thead>
<tr>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
<th>FRIDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00-8:00: BREAKFAST (provided) REGISTRATION, WORKSHOP &amp; INT'L FLAIR FAIR SIGN-UPS Grand Hanalei Foyer</td>
<td><strong>VENDOR DISPLAYS ALL DAY</strong> 7:00-8:00: BREAKFAST (provided) 7:30-8:00: WORKSHOP SIGN-UP Grand Hanalei Foyer</td>
<td><strong>VENDOR DISPLAYS ALL DAY</strong> 7:00-8:00: BREAKFAST (provided) 7:30-8:00: WORKSHOP SIGN-UP Grand Hanalei Foyer</td>
<td>7:00-8:00: BREAKFAST (provided) Grand Hanalei Foyer</td>
<td></td>
</tr>
<tr>
<td>8:00-12:00: GENERAL SESSION 9:35-10:05: BREAK Grand Hanalei</td>
<td>8:00-12:00: GENERAL SESSION 9:45-10:00: BREAK, VENDORS 10:05-12:00: BUSINESS MEETING Grand Hanalei</td>
<td>8:00-11:30: GENERAL SESSION 10:00-10:15: BREAK, VENDORS Grand Hanalei</td>
<td>8:00-12:30: GENERAL SESSION 10:00-10:15: BREAK Grand Hanalei</td>
<td></td>
</tr>
<tr>
<td>12:00-1:00: LUNCH (provided) Poolside courtyard (weather permitting) Otherwise, Kona Coast</td>
<td>12:00-1:00: LUNCH (provided) Poolside courtyard (weather permitting) Otherwise, Kona Coast</td>
<td>11:30-1:00: Lunch (on your own)</td>
<td>12:30: END OF CONFERENCE</td>
<td></td>
</tr>
<tr>
<td>1:00-5:30: GENERAL SESSION 3:00-3:20 BREAK Grand Hanalei</td>
<td>1:00-5:00: WORKSHOPS Grand Hanalei, Pacific; Tropic 2:45-3:15 BREAK, VENDORS Grand Hanalei Foyer</td>
<td>1:00-5:00: WORKSHOPS Grand Hanalei, Pacific; Tropic 2:45-3:15 BREAK, VENDORS Grand Hanalei Foyer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00-6:00 PM: BOARD MEETING Room #1649 Food and beverage may be brought into this room.</td>
<td>6:00-11:00: HOSPITALITY ROOM AND CASH BAR Grand Hanalei Foyer &amp; Patio</td>
<td>6:30-9:30: HOSPITALITY PATIO AND CASH BAR Grand Hanalei Foyer &amp; Patio</td>
<td>6:00-7:00: HAPPY HOUR WITH CASH BAR 7:00-9:00 LUAU CASH BAR Poolside courtyard (weather permitting) Otherwise, Kona Coast</td>
<td></td>
</tr>
<tr>
<td>6:00-9:00 PM: REGISTRATION, WORKSHOP &amp; INT'L FLAIR FAIR SIGN-UPS, AND RECEPTION Poolside patio. Food &amp; beverage may be brought to the patio.</td>
<td>6:00-10:00: CASH BAR Room #1649 Food and beverage may be brought into this room.</td>
<td>7:00 PM to whenever: BRING YOUR OWN CASE (BYOC) Grand Hanalei Coordinator: Stuart H. James Snacks provided</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TUESDAY, OCTOBER 1ST MORNING

<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00—08:00</td>
<td>Continental Breakfast (provided) – Grand Hanalei Foyer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Danish, freshly-baked muffins, croissants, cinnamon rolls, Kona coffee, tea, and decaf</td>
<td></td>
</tr>
<tr>
<td>07:00—08:00</td>
<td>Registration, Workshop Sign-up, and International Flair Fair Sign-up – Grand Hanalei</td>
<td></td>
</tr>
</tbody>
</table>

MODERATOR: MARTIN EVERSDIJK, Loci Forensics B.V., The Netherlands

8:00-8:20 Welcoming Remarks

8:20-8:35 Distinctions: Bloodstain Pattern Analysis and Interpretation versus Scene Reconstruction
Lynne D. Herold, Ph.D.
Los Angeles County Sheriff’s Department, California, USA

8:35-9:35 BPA - Experts in Court: "You Can't Say That, Or Can You?"
Sloan Ostbye
Office of the Primary Public Defender, California, USA

9:35-10:05 BREAK

10:05-10:10 DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES

10:10-10:30 The development of an element-based method for the reliable identification of bloodstain patterns
Sarah Cockerton
Institute of Environmental Science and Research (ESR), Auckland, New Zealand

10:30-11:00 Reliability of current methods in BPA
Niki Osborne1, Michael Taylor2, and Paul Kish3
1 Institute of Environmental Science and Research (ESR), Christchurch; University of Otago, Dunedin, New Zealand
2 Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
3 Forensic consultant, Corning, New York, USA

11:00-11:30 Quantitative Analysis of High Velocity Bloodstain Patterns
Prof. William Ristenpart
University of California, Davis, California, USA

11:30-12:00 The Use of a Novel Physical Model for Gunshot-Related Blood Spatter Simulation
Michael Taylor1 and Kevin Winer2
1 Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
2 Kansas City Police Crime Laboratory, Kansas City, Missouri, USA

12:00-1:00 LUNCH (PROVIDED): Poolside (weather permitting), otherwise Kona Coast
Beijing Stir Fry, California Greens with Balsamic Vinaigrette or Ranch Dressing, and Caribbean Rum Cake
<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-1:05</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
<td></td>
</tr>
<tr>
<td>1:05-1:35</td>
<td><em>Can we reconstruct the curved trajectories of blood drops?</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Daniel Attinger</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Mechanical Engineering, Iowa State University of Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Technology, Ames, Iowa, USA</td>
<td></td>
</tr>
<tr>
<td>1:35-2:00</td>
<td><em>Study of the Flight Motion of Blood for Bloodstain Pattern Analysis</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>in Forensic Science: Modeling and Experiment</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raquel Murray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cranfield University, Shrivenham, Oxfordshire, United Kingdom</td>
<td></td>
</tr>
<tr>
<td>2:00-2:15</td>
<td><em>Does the non-spherical shape of a spatter drop affect its trajectory?</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dr. Patrick H. Geoghegan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>University of Canterbury, Christchurch, New Zealand</td>
<td></td>
</tr>
<tr>
<td>2:15-3:00</td>
<td><em>Investigation of Impact Spatter and the Effects of Controlled</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Independent Variables</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dr. Stanley J. Bajic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Midwest Forensic Resource Center, Ames Laboratory, Iowa State University, USA</td>
<td></td>
</tr>
<tr>
<td>3:00-3:20</td>
<td><strong>BREAK</strong></td>
<td></td>
</tr>
<tr>
<td>3:20-3:25</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
<td></td>
</tr>
<tr>
<td>3:25-4:10</td>
<td><em>Man vs machine: Combining blood fluid dynamics and 3D human</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>biomechanics with cast-off pattern creation and reconstruction . . .</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>in a cage</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elisabeth Williams</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ESR Ltd and Department of Sport and Exercise Science, University of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Auckland, Christchurch, New Zealand</td>
<td></td>
</tr>
<tr>
<td>4:10-5:10</td>
<td><em>Fluid Dynamics Aspects of Bloodstain Pattern Analysis: Comparative</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>review and research opportunities</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Daniel Attinger</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Department of Mechanical Engineering, Iowa State University of Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Technology, Ames, Iowa, USA</td>
<td></td>
</tr>
<tr>
<td>5:10-5:30</td>
<td><em>Developing BPA in Poland</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kacper Choromański</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The University of Warsaw, Faculty of Law, Warsaw, Poland</td>
<td></td>
</tr>
<tr>
<td>6:00-11:00 PM</td>
<td><strong>HOSPITALITY ROOM</strong> (Cash Bar from 6:00-10:00 PM) – Room #1649</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outside food and beverages may be brought into this room.</td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td>TOPIC</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>07:00—08:00</td>
<td>Continental Breakfast (provided) – Grand Hanalei Foyer</td>
<td></td>
</tr>
<tr>
<td>07:30—08:00</td>
<td>Workshop Sign-up – Grand Hanalei</td>
<td></td>
</tr>
</tbody>
</table>

**MODERATOR: GILLIAN LEAK, Principal Forensic Services Ltd, Leeds, England, UK**

<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:05</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
</tr>
<tr>
<td>8:05-8:30</td>
<td><em>Estimating the Age of a Bloodstain</em></td>
</tr>
<tr>
<td></td>
<td>Clifton P. Bishop</td>
</tr>
<tr>
<td></td>
<td>West Virginia University, Morgantown, West Virginia, USA</td>
</tr>
<tr>
<td>8:30-9:00</td>
<td><em>Necessity of BPA in forensic medicine residency education and practice</em></td>
</tr>
<tr>
<td></td>
<td>Kemalettin Acar</td>
</tr>
<tr>
<td></td>
<td>Pamukkale University Medical School; Council of Forensic Medicine of</td>
</tr>
<tr>
<td></td>
<td>Turkish Ministry of Justice, Denizli, Turkey</td>
</tr>
<tr>
<td>9:00-9:20</td>
<td><em>The Interaction of Blood with Fabrics</em></td>
</tr>
<tr>
<td></td>
<td>Edmund (Ted) Silenieks</td>
</tr>
<tr>
<td></td>
<td>Forensic Science SA, Adelaide, South Australia, Australia</td>
</tr>
<tr>
<td>9:20-9:45</td>
<td><em>Bloodstain Pattern Analysis for Drip Stains on Bed Sheet</em></td>
</tr>
<tr>
<td></td>
<td>Prof. Stephen Michielsen</td>
</tr>
<tr>
<td></td>
<td>North Carolina State University, Raleigh, North Carolina, USA</td>
</tr>
<tr>
<td>9:45-10:00</td>
<td>BREAK</td>
</tr>
<tr>
<td>10:00-10:05</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
</tr>
<tr>
<td>10:05-12:00</td>
<td>Business Meeting. All are welcome to attend.</td>
</tr>
<tr>
<td>12:00-1:00</td>
<td>LUNCH (PROVIDED): Poolside (weather permitting), otherwise Kona Coast</td>
</tr>
<tr>
<td>1:00-5:00</td>
<td>WORKSHOPS (2:45-3:15 BREAK)</td>
</tr>
<tr>
<td>Tropic</td>
<td><em>Which Sock is Whiter? The Scientific Method and Its Application to Case-Specific Experimentation</em></td>
</tr>
<tr>
<td></td>
<td>Brian Yamashita(^1), Ph.D. and Holly Latham(^2)</td>
</tr>
<tr>
<td></td>
<td>(^1) Royal Canadian Mounted Police; Editor, Canadian Society of Forensic Science Journal, Ottawa, Ontario, Canada</td>
</tr>
<tr>
<td></td>
<td>(^2) Kansas Bureau of Identification, Great Bend; Adjunct, Fort Hays State University, Hays, Kansas, USA</td>
</tr>
<tr>
<td>Pacific</td>
<td><em>How do we reach conclusions about pattern classification in BPA?</em></td>
</tr>
<tr>
<td></td>
<td>Drs. Rachel Zajac(^1), Michael Taylor(^2), and Niki Osborne(^2)</td>
</tr>
<tr>
<td></td>
<td>(^1) Psychology Department, University of Otago, Dunedin, New Zealand</td>
</tr>
<tr>
<td></td>
<td>(^2) Institute of Environmental Science and Research (ESR), Christchurch, New Zealand</td>
</tr>
<tr>
<td>Grand Hanalei</td>
<td><em>Of What We Are Made (version 2): An Introduction to Basic Human Body Tissues</em></td>
</tr>
<tr>
<td></td>
<td>Lynne D. Herold, Ph.D. Biological Sciences</td>
</tr>
<tr>
<td></td>
<td>Los Angeles County Sheriff’s Department, CA, USA</td>
</tr>
<tr>
<td>6:30-9:30 PM</td>
<td>HOSPITALITY PATIO, cash bar – Grand Hanalei Foyer and Patio</td>
</tr>
<tr>
<td>7:00 PM to</td>
<td>BRING YOUR OWN CASE (BYOC) – Grand Hanalei</td>
</tr>
<tr>
<td>7:00 PM to</td>
<td>COORDINATOR: Stuart H. James</td>
</tr>
<tr>
<td></td>
<td>James and Associates Forensic Consultants, Ft. Lauderdale, Florida, USA</td>
</tr>
<tr>
<td>Time</td>
<td>Topic</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>07:00—08:00</td>
<td>Continental Breakfast (provided) – Grand Hanalei Foyer</td>
</tr>
<tr>
<td>07:30—08:00</td>
<td>Workshop Sign-up – Grand Hanalei Foyer</td>
</tr>
<tr>
<td></td>
<td><strong>MODERATOR: TED SILENIEKS, Forensic Science SA, Adelaide, Australia</strong></td>
</tr>
<tr>
<td>8:00-8:05</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
</tr>
<tr>
<td>8:05-8:30</td>
<td><em>Using Molecular Biology for Estimating an Extended Postmortem Interval</em>&lt;br&gt;Clifton P. Bishop&lt;br&gt;West Virginia University, Morgantown, West Virginia, USA</td>
</tr>
<tr>
<td>8:30-9:00</td>
<td><em>From liquid honey to silicon colloid chemistry: creating and assessing synthetic blood substitutes useful to the forensic sciences</em>&lt;br&gt;Theresa Stotesbury&lt;br&gt;Trent University, Peterborough, Ontario, Canada</td>
</tr>
<tr>
<td>9:00-9:45</td>
<td><em>Standardising blood physical properties: Implications for precision bloodstain pattern analysis research</em>&lt;br&gt;Elisabeth Williams&lt;br&gt;ESR Ltd and Department of Sport and Exercise Science, University of Auckland, Christchurch, New Zealand</td>
</tr>
<tr>
<td>9:45-10:00</td>
<td><em>Experimental investigation into the mechanical properties of brain simulants used for cranial gunshot simulation, and airflow ejection during collapse of the temporary cavity</em>&lt;br&gt;Dr. Patrick H. Geoghegan&lt;br&gt;University of Canterbury, Christchurch, New Zealand</td>
</tr>
<tr>
<td>10:00-10:15</td>
<td>BREAK</td>
</tr>
<tr>
<td>10:15-10:20</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
</tr>
<tr>
<td>10:20-10:50</td>
<td><em>Investigations on the use of microRNA tissue markers to correlate bloodstains with wounds</em>&lt;br&gt;Donald Johnson&lt;br&gt;California State University, Los Angeles, California, USA</td>
</tr>
<tr>
<td>10:50-11:30</td>
<td><em>Body Fluid Identification via Molecular Beacons</em>&lt;br&gt;Joshua R. Moore&lt;br&gt;West Virginia University, Morgantown, West Virginia, USA</td>
</tr>
<tr>
<td>11:30-1:00</td>
<td><strong>LUNCH (ON YOUR OWN)</strong></td>
</tr>
</tbody>
</table>
THURSDAY, OCTOBER 3rd AFTERNOON

<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-5:00</td>
<td>WORKSHOPS (2:45-3:15 BREAK)</td>
<td>42</td>
</tr>
<tr>
<td>Tropic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|            | *Which Sock is Whiter? The Scientific Method and Its Application to Case-Specific Experimentation*
|            | Brian Yamashita¹, Ph.D. and Holly Latham²                           |      |
|            | ¹Royal Canadian Mounted Police; Editor, Canadian Society of Forensic Science Journal, Ottawa, Ontario, Canada
|            | ²Kansas Bureau of Identification, Great Bend, Kansas; Adjunct, Fort Hays State University, Hays, Kansas, USA |      |
| Pacific    | 
|            | *How do we reach conclusions about pattern classification in BPA?*
|            | Drs. Rachel Zajac¹, Michael Taylor², and Niki Osborne²            | 43   |
|            | ¹Psychology Department, University of Otago, Dunedin, New Zealand
|            | ²Institute of Environmental Science and Research (ESR), Christchurch, New Zealand |      |
| Grand Hanalei | 
|            | *Forensic Pathology*
<p>|            | Jonathan Lucas, M.D.                                              | 45   |
|            | Chief Deputy Medical Examiner, San Diego County Medical Examiner Department, San Diego, California, USA |      |
| 6:00-7:00 PM| HAPPY HOUR, cash bar                                               |      |
|            | Poolside (weather permitting), otherwise Kona Coast                |      |
| 7:00-9:00 PM| LUAU, cash bar, Polynesian Dance Troop <em>Motu Nehenehe</em>             |      |
|            | Poolside (weather permitting), otherwise Kona Coast                |      |
|            | Top Round of Beef with Au Jus, Oriental Chicken with Citrus Glaze, Roasted Pig, and Assorted Desserts |      |
|            | ¹/²We agree to indemnify and hold harmless the Motu Nehenehe Polynesian Dancers, its owners, agents, members and subcontractors thereof against any and all loss, costs or expenses, or any other claim thereof, for the utilization of, or for the services provided by Motu Nehenehe Polynesian Dancers. |
|            | ¹²We understand and agree to accept responsibility for informing all members of my/our organization of this waiver and accept any and all responsibility for any claims in accordance to California State Law that might result from the utilization of, or for the services provided to, Motu Nehenehe Polynesian Dancers, its owners, agents, members and subcontractors.” |</p>
<table>
<thead>
<tr>
<th>TIME</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00—08:00</td>
<td>Continental Breakfast (provided) – Grand Hanalei Foyer</td>
</tr>
<tr>
<td>MODERATOR</td>
<td>Kacper Choromański, University of Warsaw, Faculty of Law, Warsaw, Poland</td>
</tr>
<tr>
<td>8:00-8:05</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES</td>
</tr>
<tr>
<td>8:05-8:35</td>
<td>The Psychobiology of Sensory Perceptions: Is there uncontrolled perceptive bias in the pattern matching comparative sciences? Lynne D. Herold, Ph.D. Los Angeles Sheriff’s Department Scientific Services Bureau, California, USA</td>
</tr>
<tr>
<td>8:35-10:00</td>
<td>Context bias in bloodstain pattern analysis: How much information is too much? Panel discussion moderated by LeeAnn Singley Grayson Singley Associates, LLC, Duncannon, Pennsylvania, USA</td>
</tr>
<tr>
<td>10:00—10:15</td>
<td>BREAK</td>
</tr>
<tr>
<td>10:15-10:20</td>
<td>DRAWINGS: INTERNATIONAL FLAIR FAIR AND DOOR PRIZES—DRAWINGS FOR TEXTBOOKS</td>
</tr>
<tr>
<td>10:20-10:50</td>
<td>Lifting (latent) bloodstains with the use of Alginate</td>
</tr>
<tr>
<td>10:50-11:15</td>
<td>Platform for securing and analyzing bloodstains at the crime scene using 3D technology—R&amp;D project Kamil Januszkiewicz Central Forensic Laboratory of the Police, Warsaw, Poland</td>
</tr>
<tr>
<td>11:15-11:45</td>
<td>NIST Activities that Support Forensic Scientists: Commission, Guidance Groups, and Publications</td>
</tr>
<tr>
<td>11:45-12:10</td>
<td>SWGSTAIN Update</td>
</tr>
<tr>
<td>12:10-12:20</td>
<td>2015 European Conference, Rome, Italy, Hosted by Andrea Berti</td>
</tr>
<tr>
<td>12:20-12:25</td>
<td>2014 IABPA Training Conference, Portland, Maine, Hosted by Herb Leighton</td>
</tr>
<tr>
<td>12:25-12:30</td>
<td>Closing Remarks</td>
</tr>
<tr>
<td>12:30</td>
<td>END OF CONFERENCE</td>
</tr>
</tbody>
</table>
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.

BIOGRAPHY:
Lynne D. Herold has a B. S. from Kent State University and a Ph.D. from the University of Southern California in biological sciences. She has been a forensic scientist with Los Angeles County (California) since 1982, assigned to the Los Angeles County Chief Medical Examiner—Coroner Department Laboratory Division from 1982 to 1989, and with the Los Angeles County Sheriff's Department Scientific Services Bureau from 1989 to present. At both agencies she has practiced casework in the forensic disciplines of trace evidence, bloodstain pattern analysis and crime scene reconstructions, and responded to major crime scenes.
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

BIOGRAPHY:
Sloan Ostbye has been a Public Defender for 18 years. She has worked for the Santa Clara and the San Diego County Public Defenders Offices. For the last 4 years, Sloan has been supervising attorneys in the Vista branch and more recently supervises all investigators and paralegals, and has been instrumental in the recent creation of a mitigation unit for high profile capital cases. Sloan provides training throughout the State for investigators and attorneys.
TITLE: The development of an element-based method for the reliable identification of bloodstain patterns

PRESENTER: Sarah Cockerton
AUTHORS: Sarah Cockerton and Ravishka Arthur
AFFILIATION: Institute of Environmental Science and Research (ESR), Auckland, New Zealand
EMAIL: Sarah.Cockerton@esr.cri.nz
TIME SLOT: Tuesday 10:10-10:30

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.

BIOGRAPHY:
Ms. Sarah Cockerton is a Senior Forensic Scientist employed by the Institute of Environmental Science and Research Limited, known as ESR, at Auckland, New Zealand. Sarah joined ESR in 2000 and currently works in the Auckland Forensic Service Centre where her role includes the detection, preservation and interpretation of forensic evidence for the New Zealand justice system. Sarah undertakes item and scene examinations for a range of case types including homicide, sexual assaults and serious assaults. Her focus includes the examination of bloodstain patterns at a scene and on items within the laboratory to aid in the reconstruction of events and the preparation of the evidence for presentation in court. Prior to joining the Forensic Service Centre Sarah worked in the Forensic Biology Group of ESR for 10 years specialising in the area of forensic biology and DNA analysis.
TITLE: Reliability of current methods in BPA

PRESENTERS: Niki Osborne\textsuperscript{1}, Michael Taylor\textsuperscript{2}, and Paul Kish\textsuperscript{3}

AFFILIATIONS: \textsuperscript{1} Institute of Environmental Science and Research (ESR), Christchurch; University of Otago, Dunedin, New Zealand
\textsuperscript{2} Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
\textsuperscript{3} Forensic consultant, Corning, New York, USA

EMAIL: Niki.Osborne@esr.cri.nz, Michael.Taylor@esr.cri.nz, PaulKish@stny.rr.com

TIME SLOT: Tuesday 10:30-11:00

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.

BIOGRAPHIES:
Niki is a recent PhD graduate of the University of Otago, New Zealand. Her thesis was in the area of forensic psychology, in which she examined how contextual information is used to inform decisions about forensic evidence. She is now working as a research associate on a collaborative project between the University of Otago and the Institute of Environmental Science and Research (ESR), investigating how bloodstain pattern analysts reach decisions about bloodstain patterns.

Michael is a Science Leader at ESR, New Zealand’s primary provider of forensic services, where he has been employed for over 30 years. He completed a basic BPA training course in 1991 and has subsequently frequently given evidence on bloodstain patterns in criminal trials. He has prepared and delivered basic and advanced BPA training courses in New Zealand, Australia, Canada, USA and The Netherlands. He currently oversees a BPA research program with collaborative links to universities and individuals within NZ and overseas. This is Michael’s 9th IABPA conference and has been a member since 2005.

Paul Kish is a Forensic Consultant in Corning, NY. He holds B.S. and M.S. degrees from Elmira College. He has consulted on homicide cases in 30 states and 7 countries and presented expert testimony in 22 states, the District of Columbia, and Canada. Mr. Kish has educated more than 1000 students from 18 countries; teaching weeklong courses on bloodstain pattern analysis. Since SWGSTAIN’s inception in 2002, Mr. Kish has been both a member and an executive board member. He is an Associate Editor of the IABPA Journal of Bloodstain Pattern Analysis.
Title: Quantitative Analysis of High Velocity Bloodstain Patterns

Presenter: Professor William Ristenpart

Authors: William Ristenpart, Fred Tulleners, Jennifer Saifi, and Sonya Siu

Affiliation: University of California, Davis, California, USA

Email: WDRistenpart@ucdavis.edu

Time Slot: Tuesday 11:00-11:30

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.

Biography:
William Ristenpart is the Joe and Essie Smith Endowed Professor of Chemical Engineering in the department of Chemical Engineering and Materials Science at the University of California Davis. He received his Ph.D. in chemical engineering from Princeton University and did his post-doctoral study at Harvard University. Prof. Ristenpart specializes in fluid mechanics and complex transport phenomena, with recent topics including electrocoalescence of charged droplets, shear-induced mechanotransduction in red blood cells, and disease transmission via expiratory aerosols. His research efforts in forensics have focused on quantitative characterization of blood aerosolization and consequent deposition resulting from high velocity impacts.
TITLE: The Use of a Novel Physical Model for Gunshot-Related Blood Spatter Simulation

PRESENTERS: Dr. Michael Taylor\(^1\) and Kevin Winer\(^2\)
AFFILIATIONS: \(^1\) Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
\(^2\) Kansas City Police Crime Laboratory, Kansas City, MO, USA

EMAILS: Michael.Taylor@esr.cri.nz; KevinWiner@kcpd.org
TIME SLOT: Tuesday 11:30-12:00

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.

BIOGRAPHIES:
Michael is a Science Leader at ESR, New Zealand’s primary provider of forensic services, where he has been employed for over 30 years. He completed a basic BPA training course in 1991 and has subsequently frequently given evidence on bloodstain patterns in criminal trials. He has prepared and delivered basic and advanced BPA training courses in New Zealand, Australia, Canada, USA and The Netherlands. He currently oversees a BPA research program with collaborative links to universities and individuals within NZ and overseas. This is Michael’s 9th IABPA conference and has been a member since 2005.

Kevin Winer is a Chief Criminalist Supervisor at the Kansas City Police Crime Laboratory in Kansas City, Missouri. He is an active practitioner in trace evidence, bloodstain pattern analysis and crime scene reconstruction. He supervises the Trace Evidence Section and is the Technical Leader of BPA and CSR operations at the KCPD. Firearms-related bloodstains are his primary research interest. Mr. Winer is a SWGSTAIN member and a Fellow of the American Board of Criminalistics.
TITLE: Can we reconstruct the curved trajectories of blood drops?

PRESENTER: Daniel Attinger

AUTHORS: Daniel Attinger\textsuperscript{1}, Craig Moore\textsuperscript{2}, Christophe Frankiewicz\textsuperscript{1}

AFFILIATIONS: \textsuperscript{1} Department of Mechanical Engineering, Iowa State University of Science and Technology, Ames, Iowa, USA \textsuperscript{2} Niagara Regional Police Service, St. Catharines, ON, Canada

EMAIL: Attinger@iastate.edu

TIME SLOT: Tuesday 1:05-1:35

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:


BIOGRAPHY:

Attinger’s research area is in fluid dynamics and heat transfer at small scales. After a 2001 PhD at ETH Zurich and faculty positions at Stony Brook and Columbia University, Attinger is since 2011 Associate Professor at Iowa State University. He has produced about 80 journal and conference papers. He has given seven keynote lectures at international engineering conferences, and more than 50 invited talks in America, Asia and Europe. Attinger is the recipient of the ETH Zurich medal for outstanding Ph.D. thesis (2001), an NSF CAREER award for young investigators (2005), and the 2012 ASME ICNMM 2012 Outstanding Researcher Award.
**TITLE:** Study of the Flight Motion of Blood for Bloodstain Pattern Analysis in Forensic Science: Modeling and Experiment

**PRESENTER:** Raquel Murray

**AUTHORS:** Raquel Murray¹, Franco Gaspari², Faisal Qureshi², Dhavide Aruliah², and Luis Zarrabeitia²

**AFFILIATIONS:**
1 Cranfield University, Shrivenham, Oxfordshire, United Kingdom
2 University of Ontario Institute of Technology (UOIT), Oshawa, Canada

**EMAIL:** Raquel.V.Murray@gmail.com

**TIME SLOT:** Tuesday 1:35-2:00

**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.

**BIOGRAPHY:**

Raquel Murray initiated her studies on BPA in her undergraduate years by developing a BPA Forensic Lab during the summer of 2009, which was part of her undergraduate thesis in Forensic Physics at UOIT (Canada) with Prof. Franco Gaspari. She continued her studies at the Masters level in Modeling and Computational Science, still at UOIT, under Prof. Dhavide Aruliah. During her Masters, she co-developed the software and the visual tracking scheme to study blood droplets flight. She is currently enrolled in the PhD program at Cranfield University (UK), where she is continuing her specialization in Forensic Physics.
TITLE: Does the non-spherical shape of a spatter drop affect its trajectory?

PRESENTER: Dr. Patrick H. Geoghegan

AUTHORS: N. Kabaliuk\textsuperscript{1}, M.C. Jermy\textsuperscript{1}, M.C. Taylor\textsuperscript{2}, and P.H. Geoghegan\textsuperscript{1}

AFFILIATIONS: \textsuperscript{1} Mechanical Engineering Department, University of Canterbury, Christchurch, New Zealand \textsuperscript{2} Institute of Environmental Science and Research (ESR), Christchurch, New Zealand

EMAIL: Mark.Jermy@canterbury.ac.nz

TIME SLOT: Tuesday 2:00-2:15

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.

BIOGRAPHIES:
Dr. Patrick Geoghegan is originally from the north east of Scotland. In 2007 he graduated from the University of Glasgow in Scotland with a 1st class Masters in Aeronautical Engineering. In 2012 he completed his PhD in Mechanical engineering specialising in bioengineering at the University of Canterbury, New Zealand. Since then he has worked in the forensic service centre at ESR, New Zealand and has now returned to the University of Canterbury to work. Research collaboration in forensics is continuing with ESR in his current position with his specialist knowledge in optical imaging being applied to cranial gunshot simulation and BPA.
TITLE: Investigation of Impact Spatter and the Effects of Controlled Independent Variables

PRESENTER: Dr. Stanley J. Bajic
AUTHORS: Dr. David P. Baldwin¹, Daniel S. Zamzow¹, Dr. Stanley J. Bajic¹, and Ellen Strawsine²
AFFILIATIONS: ¹Midwest Forensics Resource Center / Ames Laboratory / Iowa State University, Ames, Iowa, USA
                ²Wayne State University, Detroit, MI, USA
EMAIL: SJBajic@ameslab.gov
TIME SLOT: Tuesday 2:15-3:00

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.

BIOGRAPHY:
Dr. Bajic received his Ph.D. in 1991 from the University of Tennessee, Knoxville in Analytical Chemistry. He’s currently a research scientist at the Ames Laboratory investigating nuclear nonproliferation and forensic material analysis techniques using femtosecond-laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). He’s also the Casework Assistance Manager for the Midwest Forensics Resource Center (MFRC).
TITLE: Man vs machine: Combining blood fluid dynamics and 3D human biomechanics with cast-off pattern creation and reconstruction . . . in a cage

PRESENTER: Elisabeth Williams

AUTHORS: Elisabeth Williams¹,², Michael Taylor², Eric Huang¹, Patrick Geoghegan²,³, Jorge Spinola-Fernandez⁴,⁵, Laura Young¹, Natalia Kabaliuk⁵, Therese de Castro²,⁴, and Sharon Walt⁵

AFFILIATIONS: ¹ Department of Sport and Exercise Science, University of Auckland, New Zealand  
² Environmental Science and Research Ltd (ESR), New Zealand  
³ Department of Mechanical Engineering, University of Canterbury, Christchurch, New Zealand  
⁴ Sir John Walsh Research Institute, University of Otago, Dunedin, New Zealand  
⁵ Department of Sport and Exercise Science, Universidad de Granada, Spain

EMAIL: Elisabeth.Williams@auckland.ac.nz

TIME SLOT: Tuesday 3:25-4:10

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 focussed 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 aluminium 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® 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® 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® walls and ceilings was constructed inside a 3D motion capture 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 is possible from a cast-off pattern with known rates of error under controlled conditions.

BIOGRAPHY:

Liz is in the final stages of her PhD in Forensic Biomechanics, specialising in BPA and human movement reconstruction at the University of Auckland and ESR Ltd in New Zealand. By the time of the conference she may have it more or less completed. Her PhD has been supervised by Dr. Michael Taylor of ESR and biomechanist Dr. Sharon Walt from the University of Auckland. Liz works part time as a crossfit coach and her interests include job hunting.
TITLE: Fluid Dynamics Aspects of Bloodstain Pattern Analysis: Comparative review and research opportunities

PRESENTER: Daniel Attinger

AUTHORS: Daniel Attinger¹, Arian Jafari¹, Craig Moore², Adam Donaldson³, and Howard Stone⁴

AFFILIATIONS: ¹Department of Mechanical Engineering, Iowa State University of Science and Technology, Ames, Iowa, USA
²Niagara Regional Police Service, St. Catharines, ON, Canada
³Department of Process Engineering & Applied Science, Dalhousie University, Halifax, NS, Canada
⁴Department of Mechanical and Aerospace Engineering, Princeton University, Princeton, NJ, USA

EMAIL: Attinger@iastate.edu

TIME SLOT: Tuesday 4:10-5:10

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:

BIOGRAPHY:
Attinger’s research area is in fluid dynamics and heat transfer at small scales. After a 2001 PhD at ETH Zurich and faculty positions at Stony Brook and Columbia University, Attinger is since 2011 Associate Professor at Iowa State University. He has produced about 80 journal and conference papers. He has given seven keynote lectures at international engineering conferences, and more than 50 invited talks in America, Asia and Europe. Attinger is the recipient of the ETH Zurich medal for outstanding Ph.D. thesis (2001), an NSF CAREER award for young investigators (2005), and the 2012 ASME ICNMM 2012 Outstanding Researcher Award.
TITLE: Developing BPA in Poland

PRESENTER: Kacper Choromański
AFFILIATION: The University of Warsaw, Faculty of Law, Warsaw, Mazowieckie, Poland
EMAIL: KacperCh@poczta.onet.eu
TIME SLOT: Tuesday 5:10-5:30

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.

BIOGRAPHY:
Kacper Choromański (25). University of Warsaw Law School and Faculty of Chemistry student. Began his pursuits in Forensics in 2009. In 2010 completed the 40-hours basic BPA course at Blutspureninstitut Usingen (Germany). Assistant of "Mechanism of Creating Blood Patterns" expert at Biology Department of Central Forensic Laboratory of the Polish National Police HQ (Sept. 2010). In 2012 completed a 2.5 month-long advanced course and scholarship at James & Associates Forensic Consultants Inc., Fort Lauderdale, Florida. Since the end of 2012: private BPA Consultant. Responsible for the introduction and popularization of BPA techniques in Poland and develops Polish translation of BPA terminology.
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.

BIOGRAPHY:
Clifton P. Bishop received his BS in Biology from George Mason University and his Ph.D. in Biology/Genetics from the University of Virginia. He did a postdoctoral fellowship at Fox Chase Cancer Center and was Assistant Professor of Biology at Clarkson University in Potsdam, NY prior to joining West Virginia University. He is an Associate Professor and Associate Chairperson of Biology and a former Director of the Forensic & Investigative Science academic program at WVU. He has served on various forensic science organizations/committees including the National Institute of Justice’s Technical Working Group for Education and Training in Forensic Science.
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.

BIOGRAPHY:

Dr. Acar specializes in Forensic Medicine. He is a professor in the Forensic Medicine Department of Pamukkale University Medical School, besides additional duty at the Council of Forensic Medicine of the Turkish Ministry of Justice.

He has been interested in BPA for five years; he attended the “Basic BPA Course” in 2010, in Frankfurt, under Dr. Brodbeck’s supervision.

Dr. Acar has been a provisional member of IABPA since 2011.

He took the “Advanced BPA Course” in Nederland in 2013, under Martin Eversdijk’s supervision.

He teaches forensic medicine residents, medical students, nursery and paramedics students and he performs medicolegal autopsies. He also attends to Crime Scenes as a forensic pathologist.
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 though 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.

BIOGRAPHY:

Ted Silenieks is the Coordinator of the Evidence Recovery Section at Forensic Science SA, located in Adelaide, South Australia. The Evidence Recovery Section encompasses a BPA team that specialises in the interpretation of bloodstains on clothing. Ted is a member of the Australian BPA Scientific Working Group, the Vice President of the South Australian branch of the Australian and New Zealand Forensic Science Society and has been nominated to succeed Brett McCance as the IABPA Region VI Vice President. Together with Dr Mark Reynolds, Ted has developed an 80 hour training course teaching the interpretation of bloodstains on fabrics. Ted's presentation deals with the influence of fabric and yarn composition construction on the appearance of bloodstains on fabrics.
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 provides 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.

BIOGRAPHY:
Prof. Michielsen is new to the forensics field, but has studied the interaction of liquids with textiles for more than ten years. He received a B.S. degree in Chemistry from the State University of New York at Stony Brook and a Ph.D. from the University of Chicago. He was a Post-Doctoral Fellow at Stanford University, worked for DuPont in their Polymers and Fibers departments for 15 years before moving to Georgia Tech and finally, North Carolina State University where he is a Professor in Textile Engineering, Chemistry and Science.
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.

BIOGRAPHY:
Clifton P. Bishop received his BS in Biology from George Mason University and his Ph.D. in Biology/Genetics from the University of Virginia. He did a postdoctoral fellowship at Fox Chase Cancer Center and was Assistant Professor of Biology at Clarkson University in Potsdam, NY prior to joining West Virginia University. He is an Associate Professor and Associate Chairperson of Biology and a former Director of the Forensic & Investigative Science academic program at WVU. He has served on various forensic science organizations/committees including the National Institute of Justice’s Technical Working Group for Education and Training in Forensic Science.
TITLE: From liquid honey to silicon colloid chemistry: creating and assessing synthetic blood substitutes useful to the forensic sciences

PRESENTER: Theresa Stotesbury
AUTHORS: Theresa Stotesbury\(^1\), Dr. Michael Taylor\(^2\), Dr. Mark Jermy\(^3\), Mike Illes\(^1\), Dr. Andrew Vregdenhil\(^1\), and Dr. Paul Wilson\(^1\)
AFFILIATIONS: \(^1\)Trent University, Peterborough, ON, Canada
\(^2\)Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
\(^3\)University of Canterbury, Christchurch, Canterbury, New Zealand
EMAIL: TheresaStotes@trentu.ca
TIME SLOT: Thursday 8:30-9:00

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.

BIOGRAPHY:
Theresa Stotesbury is a Ph.D. candidate in the Materials Science program at Trent University, Peterborough, Ontario. Theresa has a background in chemistry and forensic science and is most recently the recipient of the prestigious Vanier Scholarship held by doctoral students attending Canadian universities. Her project aims to use silicon colloid chemistry to create safe artificial blood substitutes that can be used for crime scene reconstruction and BPA research. Previous to this she completed her M.Sc. in blood substitute development and assessment in New Zealand at the University of Auckland and is also a B.Sc.F.S. graduate from Trent.
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 stain presentation 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’s. All stain images were analysed using Matlab® 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.

BIOGRAPHY:

Liz is in the final stages of her PhD in Forensic Biomechanics, specialising in BPA and human movement reconstruction at the University of Auckland and ESR Ltd in New Zealand. By the time of the conference she may have it more or less completed. Her PhD has been supervised by Dr Michael Taylor of ESR and biomechanist Dr Sharon Walt from the University of Auckland. Liz works part time as a crossfit coach and her interests include job hunting.
TITLE: Experimental investigation into the mechanical properties of brain simulants used for cranial gunshot simulation, and airflow ejection during collapse of the temporary cavity

PRESENTER: Dr. Patrick H. Geoghegan

AUTHORS: M.S. Lazarjan¹, P.H. Geoghegan¹, M.C. Jermy¹, and M.C. Taylor²

AFFILIATIONS: ¹ Mechanical Engineering Department, University of Canterbury, Christchurch, New Zealand
² Institute of Environmental Science and Research (ESR), Christchurch, New Zealand

EMAIL: Milad.Soltanipour.Lazarjan@pg.canterbury.ac.nz; Patrick.Geoghegan@canterbury.ac.nz

TIME SLOT: Thursday 9:45-10:00

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-spatter is the projection of blood and tissue back toward the firearm. Three mechanisms are known to cause back-spatter: 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 responding 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 ~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.

BIOGRAPHIES:
Dr. Patrick Geoghegan is originally from the north east of Scotland. In 2007 he graduated from the University of Glasgow in Scotland with a 1st class Masters in Aeronautical Engineering. In 2012 he completed his PhD in Mechanical engineering specialising in bioengineering at the University of Canterbury, New Zealand. Since then he has worked in the forensic service centre at ESR, New Zealand and has now returned to the University of Canterbury to work. Research collaboration in forensics is continuing with ESR in his current position with his specialist knowledge in optical imaging being applied to cranial gunshot simulation and BPA.
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.

BIOGRAPHY:
Donald Johnson is an associate professor in the School of Criminal Justice and Criminalistics at the California State University, Los Angeles. Appointed to the faculty in 2003, Johnson has been active in the forensic sciences for over two decades. His career began with service to two coroner’s offices. He later advanced to senior criminalist at the Los Angeles County Sheriff’s Department, where he specialized in violent crimes. Johnson received his graduate degrees at the UCLA School of Medicine, and has published in scientific journals including Nature, Proceedings of the National Academy of Science, and the Journal of Forensic Sciences.
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.

BIOGRAPHY:
Joshua Moore received his undergraduate degrees from West Virginia University; his degrees are a B.S. in Biology and a B.S. in Forensic and Investigative Sciences. He completed a summer internship with the West Virginia State Police, where he researched the effect of blood-detecting chemicals on the quality of extracted DNA. He is now enrolled in the graduate program of the department of biology at West Virginia University, where he works on two projects: one is a portable lab for body fluid identification, and the other is the use of RNA degradation to determine the post-mortem interval.
TITLE: The Psychobiology of Sensory Perceptions: Is there uncontrolled perceptive bias in the pattern matching comparative sciences?

PRESENTER: Lynne D. Herold, Ph.D.
AFFILIATION: Los Angeles County Sheriff’s Department, Los Angeles, CA, USA
EMAIL: LDHerold@lasd.org
TIME SLOT: Friday 8:05-8:35

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.

BIOGRAPHY:
Lynne D. Herold has a B. S. from Kent State University and a Ph.D. from the University of Southern California in biological sciences. She has been a forensic scientist with Los Angeles County (California) since 1982, assigned to the Los Angeles County Chief Medical Examiner—Coroner Department Laboratory Division from 1982 to 1989, and with the Los Angeles County Sheriff’s Department Scientific Services Bureau from 1989 to present. At both agencies she has practiced casework in the forensic disciplines of trace evidence, bloodstain pattern analysis and crime scene reconstructions, and responded to major crime scenes.
TITLE: Context bias in bloodstain pattern analysis: How much information is too much?

PANEL DISCUSSION MODERATOR: LeeAnn Singley
AFFILIATION: Grayson Singley Associates, LLC, Duncannon, PA, USA
EMAIL: copsci2@msn.com
TIME SLOT: Friday 8:35-10:00

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.

BIOGRAPHY:
LeeAnn Singley is a graduate of the University of Pittsburgh where she received a Bachelor of Science degree in Biology. She also holds a Master’s Degree in Forensic Science from the University of Florida. Ms. Singley was employed as a forensic scientist in the PA State Police Crime Laboratory for 17 years prior to starting a forensic consulting business in 2004. She began her study in Bloodstain Pattern Analysis in 1993 and was privileged to have served as President the IABPA. She is currently a member of SWGSTAIN and chair of the Quality Assurance Subcommittee.
TITLE: Lifting (latent) bloodstain with the use of Alginate

PRESENTER: Martin Eversdijk
AFFILIATION: Loci Forensic Products, Nieuw Vennepe, The Netherlands
EMAIL: Martin.Eversdijk@lociforensicproducts.nl
TIME SLOT: Friday 10:20-10:50

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.

BIOGRAPHY:
Martin Eversdijk is a forensic professional and serious crime scene unit coordinator/bloodstain pattern analyst for Amsterdam-Amstelland Regional Police in The Netherlands. Martin started working as a CSI in 1993, and his interest in this field developed into extensive work and research in blood enhancement and search techniques. For seven years Martin worked as staff member/trainer at the national training center for CSI’s in the Netherlands, developing and teaching courses on BPA. Since 2011, he and his colleague Rene Gelderman have educated hundreds of colleagues/students from 26 countries in their own forensic training facility in the Netherlands.
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.

BIOGRAPHY:
Kamil Januszkiewicz is a Research and Development Specialist in the Biology Department of the Central Forensic Laboratory of the Police, an adjunct of The Witold Stefanski Institute of Parasitology of the Polish Academy of Sciences.
TITLE: NIST Activities that Support Forensic Scientists: Commission, Guidance Groups, and Publications

PRESENTER: John Paul Jones II, Program Manager
AFFILIATION: National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, USA
EMAIL: John.Jones@nist.gov
TIME SLOT: Friday 11:15-11:45

ABSTRACT:
The National Institute of Standards and Technology (NIST) has developed a large number of reference documents, tools and physical standards that support the forensic science community. The Forensic Science Program (FSP) within NIST conducts and coordinates research and provides technical services to address the needs of the forensic science community. NIST is currently engaged in many national forensic science activities that impact on the forensic science community. This lecture will address the following activities:

- NIST/DOJ Collaboration on the National Commission on Forensic Science
- Status of NIST forensic science discipline specific Guidance Groups
- Publications from the Expert Working Group on the Preservation of Biological Evidence
- Publication from Expert Working Group on Human Factors in Latent Print Analysis
- Free forensic science webcasts sponsored by NIST
- Upcoming forensic science publications/projects

BIOGRAPHY:
John Paul Jones II is a Program Manager in the Forensic Science Program at the National Institute of Standards and Technology. He is currently researching how existing Scientific Working Groups (SWGs) in the forensic industry will transition into NIST supported Guidance Groups and executing conferences to promote the application of advancements in measurement science to forensic disciplines. Mr. Jones has more than 14 years of scientific and management experience in the forensic industry including federal positions at DOJ and DoD. He received his bachelor’s degree in biochemistry from Virginia Tech and a master’s of business administration from Carnegie Mellon University.
TITLE: SWGSTAIN update

PRESENTERS: SWGSTAIN members, led by Vice-Chair Tom “Grif” Griffin
EMAIL: GrifClue@comcast.net
AFFILIATION: www.SWGSTAIN.org
TIME SLOT: Friday 11:45-12:10

ABSTRACT:
A panel of SWGSTAIN members will review the documents that have been produced by its subcommittees. This will include documents published since our formation, any revisions of these documents, and new offerings. We will also show what resources are available on our website.
WORKSHOP TITLE: Which Sock is Whiter? The Scientific Method and Its Application to Case-Specific Experimentation

PRESENTERS: Brian Yamashita\(^1\) and Holly Latham\(^2\)
AFFILIATIONS: \(^1\)Royal Canadian Mounted Police, Ottawa, Ontario, Canada
\(^2\)Kansas Bureau of Investigation, Great Bend, Kansas, USA
EMAIL: Brian.Yamashita@rcmp-grc.gc.ca, Holly.Latham@kbi.state.ks.us
TIME SLOTS: There are two offerings of this four-hour workshop: Wednesday or Thursday 1:00-5:00. BREAK: 2:45-3:15, Kona Coast foyer
CAP: Attendance is limited to 20 students each offering
ROOM: Tropic

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.

BIOGRAPHIES:
Brian Yamashita has worked for the Royal Canadian Mounted Police for 24 years. His duties include research and development of new techniques for forensic identification, troubleshooting for members in the field, delivering training, and mentoring students. He is currently the Editor of the Canadian Society of Forensic Science Journal, sits on the Editorial Board of JFI, and is a member of SWGSTAIN and SWGTREAD.

Holly Latham has been employed as a forensic scientist with the Kansas Bureau of Investigation for over 13 years. Her duties include bloodstain pattern analysis, latent print analysis, and crime scene investigation. She is a Certified Bloodstain Pattern Analyst and a Certified Latent Print Examiner with the International Association for Identification (IAI). Holly has provided training and instructed in both the field of bloodstain pattern analysis and latent prints. She is currently an Adjunct at Fort Hays State University teaching an introductory forensic science course. Holly received her Bachelor of Science Degree in Microbiology and her Master’s Degree in Justice Studies. Holly is currently the chair of the Bloodstain Pattern Analysis Subcommittee for the IAI and is a member of the Editorial Board for the Journal of Forensic Identification (JFI).
WORKSHOP TITLE: How do we reach conclusions about pattern classification in BPA?

PRESENTERS: Drs. Rachel Zajac¹, Michael Taylor², and Niki Osborne³

AFFILIATIONS: ¹ University of Otago, Dunedin, New Zealand
               ² Institute of Environmental Science and Research (ESR), Christchurch, New Zealand
               ³ Institute of Environmental Science and Research (ESR), Christchurch; University of Otago, Dunedin, New Zealand

EMAIL: RachelZ@psy.otago.ac.nz, Michael.Taylor@esr.cri.nz, Niki.Osborne@esr.cri.nz

TIME SLOTS: There are two offerings of this four-hour workshop:
Wednesday or Thursday 1:00-5:00. BREAK: 2:45-3:15 Kona Coast foyer

ROOM: Pacific

CAP: Attendance is limited to 30 students in each offering

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.

BIOGRAPHIES:
Dr. Rachel Zajac is a Senior Lecturer in the Psychology Department at the University of Otago, New Zealand. Her research encompasses psychological factors in the interpretation of forensic evidence, social influences on memory and decision-making, and children’s and adults’ eyewitness testimony. Dr Zajac is frequently called on to advise New Zealand social workers, legal practitioners, policy makers, and the courts on methods to elicit and interpret evidence. She is the Co-Director of the Innocence Project New Zealand and is closely involved with the New Zealand Police, where she regularly contributes to benchmarking practice, procedural review, and training. Dr Zajac’s research has been used in police and judicial education programmes in the UK and Australia, and in the US Supreme Court as scientific evidence.

Michael is a Science Leader at ESR, New Zealand’s primary provider of forensic services, where he has been employed for over 30 years. He completed a basic BPA training course in 1991 and has subsequently frequently given evidence on bloodstain patterns in criminal trials. He has prepared and delivered basic and advanced BPA training courses in New Zealand, Australia, Canada, USA and The Netherlands. He currently oversees a BPA research program with collaborative links to universities and individuals within NZ and overseas. This is Michael’s 9th IABPA conference and has been a member since 2005.

Niki is a recent PhD graduate of the University of Otago, New Zealand. Her thesis was in the area of forensic psychology, in which she examined how contextual information is used to inform decisions about forensic evidence. She is now working as a research associate on a collaborative project between the University of Otago and the Institute of Environmental Science and Research (ESR), investigating how bloodstain pattern analysts reach decisions about bloodstain patterns.
WORKSHOP TITLE: Of What We Are Made (version 2): An Introduction to Basic Human Body Tissues

PRESENTER: Lynne D. Herold, Ph.D. Biological Sciences
AFFILIATION: Los Angeles County Sheriff’s Department, Los Angeles, CA, USA
EMAIL: LDHerold@lasd.org
TIME SLOT: There is only one offering of this four-hour workshop:
Wednesday 1:00-5:00. BREAK: 2:45-3:15, Kona Coast foyer
CAP: Unlimited seats are available for this workshop
ROOM: Kona Coast

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

[Note: If you attended the previous version of this workshop given at the 2011 IABPA training conference in Milwaukee, the core of basic body tissues lecture is about the same. The illustrative case examples, presentation of blood as a tissue, and the step up the hierarchy to include skin as an organ and part of the integumentary system are new to version 2. You might want pop in and catch the beginning and end to see these additions. The practical demonstration of tissue types using the ham model will be deferred to the banquet night Luau!]

BIOGRAPHY:
Lynne D. Herold has a B. S. from Kent State University and a Ph.D. from the University of Southern California in biological sciences. She has been a forensic scientist with Los Angeles County (California) since 1982, assigned to the Los Angeles County Chief Medical Examiner—Coroner Department Laboratory Division from 1982 to 1989, and with the Los Angeles County Sheriff’s Department Scientific Services Bureau from 1989 to present. At both agencies she has practiced casework in the forensic disciplines of trace evidence, bloodstain pattern analysis and crime scene reconstructions, and responded to major crime scenes.
WORKSHOP TITLE: Forensic Pathology

PRESENTER: Jonathan Lucas, M.D.
AFFILIATION: San Diego County Medical Examiner Department, San Diego, CA, USA
EMAIL: Jonathan.Lucas@sdcounty.ca.gov
TIME SLOT: There is only one offering of this four-hour workshop:
            Thursday 1:00-5:00. BREAK: 2:45-3:15, Kona Coast foyer
CAP: Unlimited seats are available for this workshop
ROOM: Kona Coast

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.

BIOGRAPHY:
Dr. Lucas is currently the Chief Deputy Medical Examiner in San Diego County. He completed his forensic pathology training in New York City in 2000 and has been practicing full time forensics ever since. He has performed over 3,500 autopsies and regularly gives court testimony and attends scene investigations.