

# ENGINEERING & APPLIED SCIENCES

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## Wednesday

### Poster Session

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11:30 AM – 1:00 PM	<b>D1</b>	<b>The Design of a Centrifugal Microfluidic Disc for the Deamination of Cytosines for Forensic Epigenetics</b> <i>Jordan Keller, BS*</i> ; <i>Rachelle Turiello, MS</i> ; <i>Renna Nouwairi, BS</i> ; <i>James Landers, PhD</i>
11:30 AM – 1:00 PM	<b>D2</b>	<b>A Preliminary Machine Learning Study for Short Tandem Repeats (STRs) Profile Completion</b> <i>Ciro Di Nunzio, BS*</i> ; <i>Aldo Di Nunzio, MS*</i> ; <i>Michele Di Nunzio, MSc*</i> ; <i>Autilia Vitiello, PhD*</i> ; <i>Giovanni Acampora, PhD*</i>
11:30 AM – 1:00 PM	<b>D3</b>	<b>Temperature Profiling and Quantitative Analysis of Disperse Dyes in Polyester Via Direct Analysis in Real-Time Mass Spectrometry (DART®-MS)</b> <i>Zoe Millbern, BS*</i> ; <i>Nelson Vinueza, PhD</i>
11:30 AM – 1:00 PM	<b>D4</b>	<b>A Study on the Application of a Human Model for the Analysis of a Fall From Height</b> <i>Chan-Seong Park, PhD*</i>

## Thursday

### Forensic and Applied Sciences

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Moderator: Kurt Weiss

Co-Moderator: Darren Franck

8:30 AM – 9:00 AM	<b>D5</b>	<b>The Differential Performance of Dynamic Vapor Microextraction for Recovery of Ignitable Liquid Compounds Investigated Within a Sensitivity Analysis</b> <i>Jennifer Berry, PhD*</i> ; <i>Mary Gregg, PhD</i> ; <i>Amanda Koepke, PhD</i> ; <i>Kavita Jeerage, PhD</i>
9:00 AM – 9:30 AM	<b>D6</b>	<b>Water Modeling of River Streams as a Tool for the Delimitation of Areas of Potential Disposal Sites of Missing Persons' Bodies</b> <i>Daniela Orozco Ramelli, DO*</i> ; <i>Luz Perez, PhD</i> ; <i>Ana Carolina Guatame, MSc</i> ; <i>Jorge Escobar, PhD</i> ; <i>David Trujillo, MSc</i>
9:30 AM – 9:45 AM	<b>D7</b>	<b>The Perils of Using Linear Analysis for Metal Component Failures</b> <i>Bart Kemper, BSME*</i>
9:45 AM – 10:00 AM	<b>D8</b>	<b>The Effects of Land and Grooves on the Trajectory of a 9mm Bullet in a Denser Medium</b> <i>Ali Shahid Hussain, BS*</i>
10:00 AM – 10:15 AM		<b>BREAK</b>

### Linguistics

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Moderator: Kurt Weiss

Co-Moderator: Darren Franck

10:15 AM – 10:35 AM	<b>D9</b>	<b>Guessing the Twist of the Rifling of the 9mm Pistol From the Cartridge Case</b> <i>Ali Shahid Hussain, BS*</i>
10:35 AM – 10:50 AM	<b>D10</b>	<b>When Poor Knowledge of Basic Physics Results in Useless Trials</b> <i>Alessandro Ferrero, MSc*</i> ; <i>Veronica Scotti, MJ</i>

# ENGINEERING & APPLIED SCIENCES

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10:50 AM – 11:05 AM	<b>D11</b>	<b>A Haystack Falls and Injures a Dairy Farm Worker: Forensic Testing Used to Determine the Force Required to Topple the Stack</b> <i>Kurt Weiss, MS*</i>
11:05 AM – 11:35 AM	<b>D12</b>	<b>Satellite Laboratories at the Front Line: The Canadian Border Approach to Narcotics Detection Within Postal and Air Cargo Facilities</b> <i>Sandra Ferreira, MS*; Chad Maheux, MS, MPA*</i>
11:35 AM – 11:50 AM	<b>D13</b>	<b>Identification on the Basis of Chamber Marks of .30 Caliber Firearms</b> <i>Ali Shahid Hussain, BS*</i>
11:50 AM – 1:00 PM		<b>BREAK</b>

## Vehicles Collisions and Safety Standards

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Moderator: Darren Franck

Co-Moderator: Kurt Weiss

1:00 PM – 1:20 PM	<b>D14</b>	<b>Testing Basic Toolkits for Forensic Text Analysis: Lemmatizers</b> <i>Carole Chaski, PhD*; Angela Almela, PhD; Pascual Cantos, PhD</i>
1:20 PM – 1:40 PM	<b>D15</b>	<b>True and False Sexual Assault Victim Statements</b> <i>Carole Chaski, PhD*</i>
1:40 PM – 2:00 PM	<b>D16</b>	<b>Validation Testing of a Syntactic Authorship Identification Method Using Ground-Truth Data From 25 Authors</b> <i>Angela Almela, PhD*</i>
2:00 PM – 2:15 PM		<b>BREAK</b>

Moderator: Harold Franck

Co-Moderator: Michelle Hoffman

2:15 PM – 2:30 PM	<b>D17</b>	<b>Recreational Vehicle (RV) Crashworthiness: Enhanced Injury Caused by Unsafe Vehicle Interior Structures Combined With Predictable Seat and Belt Failures</b> <i>Mark Pozzi, MS*; Vijay Gupta, PhD; Jack Bish, PhD</i>
2:30 PM – 2:45 PM	<b>D18</b>	<b>The Mechanics of All-Terrain Vehicle (ATV) Rollovers</b> <i>David Pienkowski, PhD*</i>
2:45 PM – 3:05 PM	<b>D19</b>	<b>Rear Impact Crashworthiness Defects Proven by Forensic Analysis and Testing: Failures of Seats, Head Restraints, and Belts</b> <i>Mark Pozzi, MS*; Paul Lewis, MS; Kenneth Saczalski, PhD</i>
3:05 PM – 3:25 PM	<b>D20</b>	<b>Child Fatalities in Vehicular Rear Impact: Forensic Analysis and Testing to Scientifically Prove Seat and Belt Failures</b> <i>Mark Pozzi, MS*; Kenneth Saczalski, PhD; Todd Saczalski, BSMET</i>
3:25 PM – 3:40 PM		<b>BREAK</b>

# ENGINEERING & APPLIED SCIENCES

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3:40 PM – 4:00 PM	<b>D21</b>	<b>The Effectiveness of Roadside Barriers in Reducing Accident Severity</b> <i>Darren Franck, MSME*; Harold Franck, MSEE</i>
4:00 PM – 4:15 PM	<b>D22</b>	<b>Elderly Female Side Impact: An Experimental Analysis of Side Impact Injuries Using Instrumented Postmortem Human Subjects (PMHS), Current Restraint Technologies, and Real-World Crash Boundary Conditions</b> <i>John Bolte, PhD*; Amanda Agnew, PhD; Yun-Seok Kang, PhD</i>
4:15 PM – 4:30 PM	<b>D23</b>	<b>Event Data Recorder (EDR) Data and Restraint Use: A Case Study</b> <i>Michelle Hoffman, MS*</i>
4:30 PM – 4:45 PM	<b>D24</b>	<b>Criminal Engineering: The Ugly 50-Year History of Federal Motor Vehicle Safety Standard (FMVSS) 207 and Proposals for an Upgraded Safety Standard That Will Prevent Catastrophic Injury and Death</b> <i>Mark Pozzi, MS*; Kenneth Saczalski, PhD</i>

## Poster Session

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11:30 AM – 1:00 PM	<b>D25</b>	<b>Reverse Engineering Techniques in Forensic Investigations: A New Approach to Bitemark Analysis</b> <i>Enrica Macorano, MD*; Valeria Santoro, PhD; Mariagrazia Calvano, MD; Federica Mele, MD; Mirko Leonardelli, MD; Stefano Duma, MD; Giovanni De Gabriele, MD; Luigi Maria Galantucci, PhD; Francesco Introna, MD</i>
11:30 AM – 1:00 PM	<b>D26</b>	<b>Microfluidics: Streamlining Ink Identification Using Mass Spectrometry</b> <i>Morgan Demmler, MS*; Nelson Vinueza, PhD</i>
11:30 AM – 1:00 PM	<b>D27</b>	<b>Deep Learning Models to Estimate Age and Sex From Images of the Pubic Symphyseal Surface and Greater Sciatic Notch</b> <i>Hyun Jin Park, PhD*; Kyubaek Yoon, MS; Jongeun Choi, PhD; Eun Jin Woo, PhD; Kyung-Seok Hu, DDS, PhD</i>
11:30 AM – 1:00 PM	<b>D28</b>	<b>A Study of a Method for Estimating Mechanism of Injury to Children Caused by External Force: Collisions of Children With the Floor</b> <i>Taiki Watamabe, BEng*; Yasumi Ito, PhD; Yuki Kunugi, BEng; Issei Watanabe, BEng; Ryuichi Yamada, PhD; Yoshiyuki Kagiya, PhD; Tetsuya Nemoto, PhD; Kosuke Kurata, MS; Toshiyuki Harama, BEng</i>
11:30 AM – 1:00 PM	<b>D29</b>	<b>The Magnetic Recovery and Mass Spectrometric Analysis of Fingermarks Contaminated With Cosmetics Products</b> <i>Entesar Al-Hetlani, PhD*; Sara Al-Sayed, BSc; Mohamed Amin, MSc</i>
11:30 AM – 1:00 PM	<b>D30</b>	<b>The Application of Environmental Design Principles in Preventing Crime and Reducing Fear of Crime in Cities: The Case of Kocaeli, Turkey</b> <i>Tugba Unsal Sapan, PhD*; Busra Ozen, BArch*; Sevil Atasoy, PhD</i>
11:30 AM – 1:00 PM	<b>D31</b>	<b>Generalized Cosine Similarity for Mass Spectral Comparisons</b> <i>Anthony Kearsley, PhD*; Arun Moorthy, PhD; Matthew Roberts, PhD; Edward Sisco, PhD</i>

# ENGINEERING & APPLIED SCIENCES

## Friday—Session I

### Multidisciplinary Session: Forensic Nursing Science and Engineering & Applied Sciences

Moderator: Jamie Ferrell

Co-Moderator: Kurt Weiss

8:30 AM – 8:45 AM	<b>E17</b>	<b>Nursing and Engineering Partnerships Lead to Important Advances</b> <i>Joyce Williams, DNP*</i>
8:45 AM – 9:00 AM	<b>D32</b>	<b>Rapid Isolation of Sperm From Sexual Assault Case-Type Samples Utilizing a Microfluidic Device</b> <i>Kathryn Stephens, PhD*</i> ; <i>Adam Bisogni, PhD</i> ; <i>Gothami Padmabandu, MS</i> ; <i>Joana Antunes, PhD</i> ; <i>Harvey Tian, PhD</i> ; <i>Richelle Barta, BS</i>
9:00 AM – 9:15 AM	<b>E18</b>	<b>Identifying Information in Protein From Sexual Assault Evidence</b> <i>Glendon Parker, PhD*</i> ; <i>Victoria Montgomery, MSc</i>
9:15 AM – 9:30 AM	<b>D33</b>	<b>The Detection of Saliva Stains Using Attenuated Total Reflectance/Fourier Transform Infrared (ATR/FTIR) Spectroscopy: The Effect of Surface and Time</b> <i>Entesar Al-Hetlani, PhD*</i> ; <i>Dalal Al-Sharji, MSc</i> ; <i>Mohamed Amin, MSc</i> ; <i>Igor Lednev, PhD</i>
9:30 AM – 9:45 AM	<b>E19</b>	<b>Right Under Our Noses: Understanding Missed Opportunities for the Collection of Saliva as Evidence</b> <i>Diana Faugno, MSN*</i> ; <i>Jessica Volz, DNP*</i>
9:45 AM – 10:00 AM		<b>BREAK</b>

Moderator: Jamie Ferrell

Co-Moderator: Kurt Weiss

10:00 AM – 10:15 AM	<b>D34</b>	<b>Wheelchair User Sues Pharmacy for Access as a Violation of the Americans With Disabilities Act</b> <i>Robert Lynch, BArch*</i>
10:15 AM – 10:30 AM	<b>E20</b>	<b>Long-Term Care Facilities (LTCFs) and Nursing Homes (NH) SARS-COV2 Infections: Inevitable Conditions or Medical Malpractice?</b> <i>Domenicantonio Iannello*</i> ; <i>Elena Forzese*</i> ; <i>Gennaro Baldino, MD</i> ; <i>Daniela Sapienza</i> ; <i>Alessio Asmundo</i> ; <i>Chiara Stassi</i> ; <i>Elvira Ventura Spagnolo, MD, PhD</i> ; <i>Cristina Mondello, MD, PhD*</i>
10:30 AM – 11:00 AM	<b>D35</b>	<b>Electrical Injury Evidence and Sequelae</b> <i>Helmut Brosz, BASc*</i>
11:00 AM – 11:15 AM	<b>E21</b>	<b>A Descriptive Study of Non-Fatal Strangulation in Sexual Assault</b> <i>Julie Valentine, PhD, MSN*</i> ; <i>Brooke Stacey, BSN*</i> ; <i>Leslie Miles, DNP</i>
11:15 AM – 11:30 AM	<b>D36</b>	<b>Failure of Suture Materials Used for a Cesarean Section</b> <i>Sarah Hainsworth, BEng, PhD*</i>
11:30 AM – 11:45 AM	<b>E11</b>	<b>A Collaborative Artificial Intelligence Platform for Bruise Age Analysis</b> <i>Katherine Scafide, PhD, RN*</i> ; <i>David Lattanzi, PhD, PE*</i> ; <i>Janusz Wojtusiak, PhD</i>
11:45 AM – 12:00 PM		<b>Questions &amp; Answers</b>

# ENGINEERING & APPLIED SCIENCES

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## Multidisciplinary Session: Digital & Multimedia Sciences and Engineering & Applied Sciences The Next 75 Years—The Application of Technology/DMS to the Forensic Sciences

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Moderator: J. Levi White

Co-Moderator: Christina Malone

1:05 PM – 1:30 PM	<b>C30</b>	<b>The Possibilities of Artificial Intelligence in Digital and Multimedia Sciences AI4Forensics</b> <i>Zeno Geradts, PhD*</i>
1:30 PM – 1:50 PM	<b>C31</b>	<b>The Implementation and Testing of Triplet Convolutional Neural Networks for Forensic Image Matching: Phase I—Setting Up the Algorithm</b> <i>Brahmani Reddy Aileni, BS; Sharon Derrick, PhD*; Ruby Mehrubeoglu, PhD</i>
1:50 PM – 2:10 PM	<b>D37</b>	<b>On-Board Video Analysis Is Used to Defend a Truck Operator in the Case of a Pedestrian Killed in the Crosswalk</b> <i>Kurt Weiss, MS*</i>
2:10 PM – 2:30 PM	<b>D38</b>	<b>WITHDRAWN</b>
2:30 PM – 2:50 PM	<b>D39</b>	<b>Video Analysis Helps Defend Municipality in Bicyclist's Impact With a Truck</b> <i>Kurt Weiss, MS*</i>
2:50 PM – 3:00 PM		<b>BREAK</b>
3:00 PM – 3:20 PM	<b>C32</b>	<b>A Universal Disaster Victim Identification Digital Tool for the Management of Fragmented Cross-Jurisdictional Missing Persons' Lists and Antemortem Data in Mass Disasters With Multinational Victims</b> <i>Shada Alsalamah, PhD*; Afrah Alotaibi, MSc; Sakher Al-Qahtani, PhD*</i>
3:20 PM – 3:40 PM	<b>C33</b>	<b>Augmented Reality Applications for Craniofacial Reconstruction and Fracture Margin Assessment in Forensic Anthropology</b> <i>Katharine Kolpan, PhD*; Jeffrey Vadala, PhD</i>
3:40 PM – 4:00 PM	<b>D40</b>	<b>Forensic Human Identification From Facial and Cranial Images Using Deep Learning</b> <i>Mario Villar, BS; Andrea Valsecchi, PhD*; Pablo Mesejo, PhD</i>
4:00 PM – 4:20 PM	<b>C34</b>	<b>Potentialities of the Anatomage Table in Forensic Training and Education Programs</b> <i>Emilio Nuzzolese, PhD*; Corrado Cali, PhD; Giancarlo Di Vella, PhD</i>