

NATIONAL INSTITUTE OF JUSTICE



Forensic Science Research and Development (R&D) Symposium

The National Institute of Justice (NIJ) Forensic Science R&D Symposium is an open meeting where attendees can learn about NIJ-funded research across a variety of forensic science areas. AAFS meeting registration is not necessary. Feel free to log on and listen to specific presentations or stay all day and learn about the diverse NIJ forensic science R&D portfolio. This year, NIJ will also have a poster session highlighting recent research.

Information will be available at: <https://forensiccoe.org/workshop/2021-nij-forensic-science-rd-symposium/>.

Tuesday

February 16, 2021

10:00 a.m. – 5:40 p.m.

Track 1: Session I

Controlled Substances and Toxicology

Moderator: Frances Scott, PhD

10:00 a.m. - 10:10 a.m.

Welcome and Opening Remarks

Lucas W. Zarwell, MFS; Frances Scott, PhD

10:10 a.m. - 10:30 a.m.

A Rapid Forensic Identification of Psychoactive Plant Types by Multivariate Data Analysis of a Direct Analysis in Real-Time Mass Spectrometry (DART®-MS) Plant Database, Featuring a User-Friendly Graphical User Interface

Rabi A. Musah, PhD

10:30 a.m. - 10:50 a.m.

Increasing Safety, Speed, Sensitivity, and Selectivity of Controlled Substance Analysis

Amber Burns, MS

10:50 a.m. - 11:10 a.m.

Determining the Quality of Mass Spectral Library Searches Using a Quantitative Reliability Metric

Preshious Rearden, PhD

11:10 a.m. - 11:30 a.m.

Characterization of the Vapor Profile of Fentanyl and Related Analogs for Instrumental and Canine Detection

Lauryn DeGreeff, PhD

11:30 a.m. - 11:50 a.m.

Questions and Answers

11:50 a.m. - 12:10 p.m.

Break

12:10 p.m. - 12:30 p.m.

Chemical Foundations for a Cannabis Breathalyzer: Vapor Pressure Measurements and a Pilot Breath Collection Study

Tara M. Lovestead, PhD

12:30 p.m. - 12:50 p.m.

An Evaluation of Pre-Treatment Parameters in Forensic Hair Testing Using Statistical Design of Experiments (DoE)

Brianna Spear

12:50 p.m. - 1:10 p.m.

Identification of Phase II Opioid Metabolites in Human Hair

Megan Grabenauer, PhD

1:10 p.m. - 1:30 p.m.

The Development and Validation of Two Automated Sample Preparation Techniques for the Comprehensive Screening for Biological Matrices Using Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry: A Correlative Analysis of Drug Recognition Expert Evaluations and Forensic Toxicology Results in Suspected Driving Under the Influence of Drugs Cases

Rebecca Wagner, PhD

1:30 p.m. - 1:50 p.m.

Questions and Answers

1:50 p.m. - 2:00 p.m.

Break



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Track 1: Session II

Forensic Anthropology and Forensic Pathology

Moderator: Danielle McLeod-Henning

- 2:00 p.m. - 2:10 p.m. **Welcome and Opening Remarks**
Lucas W. Zarwell, MFS; Danielle McLeod-Henning
- 2:10 p.m. - 2:35 p.m. **A DNA Barcoding Strategy for Blow and Flesh Flies Encountered During Medicolegal Casework**
Sam Kwiatkowski, PhD
- 2:35 p.m. - 3:00 p.m. **The Impact of Drugs on Human Decomposition and the Postmortem Interval: Insect, Scavenger, and Microbial Evidence**
Dawnie W. Steadman, PhD
- 3:00 p.m. - 3:25 p.m. **Modeling the Fluvial Transport of Human Remains in the Sacramento River, California**
Eric J. Bartelink, PhD; Colleen F. Milligan, PhD
- 3:25 p.m. - 3:45 p.m. **Questions and Answers**
- 3:45 p.m. - 4:05 p.m. **Break**
- 4:05 p.m. - 4:30 p.m. **Skeletal Trauma Research in Forensic Anthropology**
Angela L. Harden, MA
- 4:30 p.m. - 4:55 p.m. **Postmortem Iris Recognition**
Adam Czajka
- 4:55 p.m. - 5:20 p.m. **Understanding the Pathology of Homicidal Pediatric Blunt Neurotrauma Through the Correlation of Advanced Magnetic Resonance Images With Histopathology**
Heather S. Jarrell, MD
- 5:20 p.m. - 5:40 p.m. **Questions and Answers**

Track 2: Session I

Impression and Pattern Evidence/Trace Evidence

Moderator: Gregory Dutton, PhD

- 10:00 a.m. - 10:10 a.m. **Welcome and Opening Remarks**
Lucas W. Zarwell, MFS; Frances Scott, PhD
- 10:10 a.m. - 10:35 a.m. **A Black Box Evaluation of Bloodstain Pattern Analysis Conclusions**
Austin R. Hicklin, PhD
- 10:35 a.m. - 11:00 a.m. **Physics and Statistical Models for Physical Match Analysis Utilizing 3D Microscopy of Fracture Surfaces**
Ashraf F. Bastawros, PhD
- 11:00 a.m. - 11:25 a.m. **Results of the 2019 3D Virtual Comparison Microscopy Topography Resolution Study (VCMTRS)**
Ryan Lilien, PhD
- 11:25 a.m. - 11:45 a.m. **Questions and Answers**
- 11:45 a.m. - 12:05 p.m. **Break**
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12:05 p.m.	-	12:30 p.m.	Determining Fingerprint Age With Mass Spectrometry Imaging of Triacylglycerols <i>Young-Jin Lee</i>
12:30 p.m.	-	12:55 p.m.	The Application of Morphologically Directed Raman Spectroscopy (MDRS®) for the Forensic Examination of Soils <i>Brooke W. Kammrath, PhD</i>
12:55 p.m.	-	1:20 p.m.	Raman Microspectroscopy and Advanced Statistics for Detection and Characterization of Gunshot Residue <i>Igor K. Lednev, PhD</i>
1:20 p.m.		1:40 p.m.	Questions and Answers
1:40 p.m.	-	2:00 p.m.	Break
Track 2: Session II			Forensic Biology/DNA <i>Moderator: Gregory Dutton, PhD</i>
2:00 p.m.	-	2:10 p.m.	Welcome and Opening Remarks <i>Lucas W. Zarwell, MFS; Gregory Dutton, PhD</i>
2:10 p.m.	-	2:35 p.m.	Population Distribution and Factors Affecting Individual DNA Shedding Propensity <i>Mechthild K. Prinz, PhD</i>
2:35 p.m.	-	3:00 p.m.	Environmental Persistence of Touch DNA <i>Meghan Ramsey, PhD</i>
3:00 p.m.	-	3:25 p.m.	Toward Developing Forensically Relevant Single Cell Pipelines by Incorporating Unsupervised Clustering <i>Ken R. Duffy, PhD</i>
3:25 p.m.	-	3:45 p.m.	Questions and Answers
3:45 p.m.		4:05 p.m.	Break
4:05 p.m.	-	4:30 p.m.	A Universal Method for Biological Stain Identification and Analysis Using Raman Spectroscopy <i>Igor K. Lednev, PhD</i>
4:30 p.m.	-	4:55 p.m.	The Effect of Storage Conditions on Estimates of the Age of Dried Bloodstains <i>Robert W. Allen, PhD</i>
4:55 p.m.	-	5:20 p.m.	An Epigenetic Multiplex Capable of Discriminating Body Fluid Type, Age, and Phenotype <i>Bruce R. McCord, PhD</i>
5:20 p.m.	-	5:40 p.m.	Questions and Answers



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Poster Session

Monday, February 15, 2021

10:00 a.m. – 5:40 p.m.

Tuesday, February 16, 2021

10:00 a.m. – 5:40 p.m.

- 1 Investigating Upper Thermal Limits of Forensically Important Blow Flies to Improve Testimony in Forensic Entomology**
Travis W. Rusch
 - 2 The New Mexico Decedent Image Database (NMDID): A New Resource for Forensic Anthropology**
Shamsi Daneshvari Berry, PhD; Heather J.H. Edgar, PhD
 - 3 How Skin Color Affects Bruise Assessments by Alternate Light: The Results of a Randomized Controlled Trial**
Katherine N. Scafide, PhD; Nancy Downing
 - 4 Auto-Curation of a Large Human Decomposition Image Collection**
Sara Mousavi
 - 5 Coupling Raman Spectroscopy With Ambient Sampling, Portable Mass Spectrometry for On-Site, High-Throughput Evidence Confirmation on a Single Instrumental Platform**
Christopher Mulligan
 - 6 The Preservation of Forensically Relevant Biological Materials With Commercial Off-the-Shelf Antioxidants and Chelators**
Abigail S. Bathrick, MFS
 - 7 An Evaluation of Massively Parallel Sequencing (MPS) Technology on Tissues Collected for Forensic Identification From the Body Farm**
Elisa Wurmbach, PhD
 - 8 A Rotational Platform-Driven Microdevice for Differential Separation, Purification, and Amplification of Sexual Assault Forensic Samples**
Tracey Dawson Cruz, PhD
 - 9 Decontamination of Crime Scene Equipment: An Evaluation of Current Methods and Best Practices**
Donia Slack, MS
 - 10 Improving Results From Touch DNA Evidence With Optimized Direct Polymerase Chain Reaction (PCR) Methods**
Anna C. Salmonsén, BS
 - 11 Paper Microfluidic Single-Walled Carbon Nanotubes Chemiresistive Biosensor Arrays for Body Fluids Identification**
Ashok Mulchandani
 - 12 The Occurrence and Utility of Non-Identifiable Fingermarks**
David A. Stoney, PhD
 - 13 The Use of Empirical Algorithms for Fire Investigation Analysis**
Daniel Madrzykowski, PhD
 - 14 Security Crystals: Near-Infrared (NIR) -to-NIR Upconverting Nanoparticles for Fingerprint Identification and DNA Extraction**
William M. Cross, PhD
 - 15 Statistical Error Estimation for an Objective Measure of Similarity to a Latent Image**
Donald T. Gantz, PhD
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- 16 A Characterization and Analysis of Lithium-Ion Battery Fire Signatures and Debris**
Ofodike Ezekoye

 - 17 Forensic Interpretation of Multiple Concurrent Audio Recordings**
Rob C. Maher, PhD

 - 18 Evaluating and Optimizing DNA Extraction and Amplification Protocols for Microbiome-Based Forensic Applications**
Logan J. Willis

 - 19 Key Factors in Particle Combination Analysis**
David A. Stoney, PhD

 - 20 Post-Blast Explosives Attribution**
Paul J. Ippoliti

 - 21 Validating the Sexual Lubricant Database Using True Known and Unknown Samples for Forensic Analysis**
Santana A.L. Thomas, PhD
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