CFSO
Consortium of Forensic Science Organizations

NATIONAL FORENSIC SCIENCE WEEK 2025

NIST Presentation Series

MON

September 15th at 11:00 AM MST/1:00 PM EST

FORENSIC DNA TYPING ACTIVITIES IN THE NIST APPLIED GENETICS GROUP

Speaker: Pete Vallone

TUE

September 16th at 11:00 AM MST/1:00 PM EST

DETECTION OF Δ^9-THC IN CANNABIS-INFUSED GUMMIES AND BREATH AFTER CONSUMPTION

Speakers: Walter (Brent) Wilson and Tara M. Lovestead

WED

September 17th at 11:00 AM MST/1:00 PM EST

SCIENTIFIC FOUNDATIONS FOR FIREARM EVIDENCE: NIST'S ROLE IN ADVANCING OBJECTIVITY

Speaker: Xiaoyu Alan Zheng

THU

September 18th at 11:00 AM MST/1:00 PM EST

SUPPORTING FORENSIC CHEMISTRY LABORATORIES THROUGH TEST MATERIALS, RESEARCH, VALIDATION, AND DATA

Speakers: Sarah Shuda and Edward Sisco

FRI

September 19th at 11:00 AM MST/1:00 PM EST

FLOW VISUALIZATION AND SCIENTIFIC IMAGING TOOLS FOR STUDYING THE AEROSOLIZATION, TRANSPORT, AND ULTIMATE FATE OF DRUG CONTAMINATION

Speaker: Matthew Staymates

Advance registration is required for each presentation

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MON

NIST Presentation Series

SEPTEMBER 15TH

11:00 AM MST/1:00 PM EST

FORENSIC DNA TYPING ACTIVITIES IN THE NIST APPLIED GENETICS GROUP

This presentation will provide an overview of the Applied Genetics group's (AGG) focus and current activities:

AIMS: The Forensic Genetics Project develops DNA standards and reference materials to ensure accuracy, reliability, and consistency across forensic DNA laboratories.

RESEARCH PORTFOLIO: Advance forensic genetics, enabling the development of new methods and technologies for analyzing DNA evidence, such as rapid DNA testing and next-generation sequencing.

RESOURCES: Provide open-source data, software tools, and the STRBase web resource (strbase.nist.gov) for forensic community access.

KNOWLEDGE SHARING: Publish findings and resources to facilitate adoption of the information and support the development of reliable DNA analysis methods.

Registration Link: https://boisestate.zoom.us/webinar/register/WN_GZJ4_t0DQqem8ZaI8hJ5Mw

Presenter: Pete Vallone

Over the last 25 years at NIST, Dr. Vallone has developed PCR-based assays for the detection of genetic variation, developed methods for the rapid amplification of STR loci, and has been involved in developing and characterizing nucleic acid-based reference materials. As the Applied Genetics Group leader at NIST since 2013, Dr. Vallone works with a team of researchers producing DNA reference materials and assessing emerging techniques such as next-generation sequencing and digital PCR. The group's efforts provide research and training that support the forensic DNA typing community.

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TUE

NIST Presentation Series

SEPTEMBER 16TH

11:00 AM MST/1:00 PM EST

DETECTION OF Δ^9-THC IN CANNABIS-INFUSED GUMMIES AND BREATH AFTER CONSUMPTION

Amid a rapidly evolving legal landscape, this presentation will describe ongoing research at NIST on *Cannabis* edibles.

CHANGING LANDSCAPE: The legalization of products with potentially intoxicating quantities of Δ^9-THC and isomeric cannabinoids has markedly increased in the last decade.

HEALTH CONCERNS: Edibles are more likely linked to pediatric poisonings and ER visits than inhaled products. Delayed onset and long duration of psychoactive effects complicate the predictibility of peak impairment.

OPTIMIZED QUANTITATION: Experimentation led to the development of an optimized Δ^9-THC quantitation method for edibles.

INNOVATION: Proof-of-concept showing Δ^9-THC detection in breath, supporting development of cannabis breathalyzer technologies for public and workplace safety.

Registration Link: https://boisestate.zoom.us/webinar/register/WN_oO_UQin0TBOc7k5u8WQ8kA

Presenters: Walter (Brent) Wilson and Tara Lovestead

Walter (Brent) Wilson is a Research Chemist at NIST in Gaithersburg, MD. He focuses on developing analytical methods and reference materials for use in forensic and Cannabis testing laboratories. He is an active member of multiple international standards organizations, including the D37 Cannabis Committee in ASTM International and the Cannabis Analytical Science Program in AOAC International.

Tara Lovestead leads the Fluid Characterization Group at NIST in Boulder, CO. She is engaged in the development of reference materials and delivery systems to ensure reliable breath analysis in the field. She also serves as the vice chair and recording secretary of the D37 Cannabis Laboratory Subcommittee in ASTM International. She was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE) for her research achievements and service to the scientific community.

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WED

NIST Presentation Series

SEPTEMBER 17TH

11:00 AM MST/1:00 PM EST

SCIENTIFIC FOUNDATIONS FOR FIREARM EVIDENCE: NIST'S ROLE IN ADVANCING OBJECTIVITY

This presentation will explore advancements in metrological techniques applied to firearm and toolmark analysis:

INCREASED SCRUTINY: Firearm and toolmark analysis has traditionally relied on subjective judgment of trained examiners. Courts, scientists, and the public have called for greater scientific rigor and transparency.

NIST MILESTONES: Developed 3D measurement methods for toolmarks, created physical and digital reference standards, established documentary standards for examination practices, launched open-access databases, advanced comparison algorithms to quantify toolmark similarity, implemented statistical protocols to evaluate match significance, and completed foundational studies to assess the reliability of forensic conclusions.

IMPACT: These advancements contribute to a more objective, statistically grounded approach to firearm and toolmark analysis.

Registration Link: https://boisestate.zoom.us/webinar/register/WN_bpfkPLbJTXeBibLCArS2MQ

Presenter: Xiaoyu Alan Zheng

Xiaoyu Alan Zheng is a Mechanical Engineer in the Sensor Science Division at NIST, specializing in objective measurements and statistical analysis of 2D/3D firearm toolmarks. He holds a B.S. and M.S. in Mechanical Engineering and focuses on improving forensic comparisons and evidence reporting. Zheng serves on the NIST OSAC Subcommittee on Firearms & Toolmarks, chairs the AFTE Technical Advisor Committee, and co-chairs the TWG3D2T.

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THU

NIST Presentation Series

SEPTEMBER 18TH

11:00 AM MST/1:00 PM EST

SUPPORTING FORENSIC CHEMISTRY LABORATORIES THROUGH TEST MATERIALS, RESEARCH, VALIDATION, AND DATA

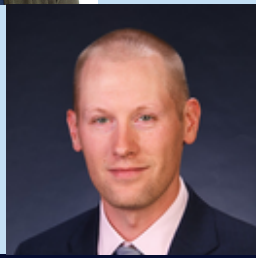
This presentation will provide an overview the following projects relevant to forensic chemists:

- **CHARACTERIZED AUTHENTIC DRUG SAMPLES (CADS) PROJECT:** Authentic street drug samples characterized as Research Grade Test MAterials for reliable method validation.
- **VALIDATION AND IMPLEMENTATION PACKAGES (VIPs):** Ready-to-use method guidance & tools to accelerate adoption of new technologies in labs.
- **INTERLABORATORY STUDIES:** Nationwide efforts to assess practices, identify where standards are needed, and guide research needs.
- **RAPID DRUG ANALYSIS AND RESEARCH (RaDAR) PROGRAM:** Real-time (<48 hrs) drug analysis for public health & safety, with mobile lab expansion and emerging substance detection.

Registration Link: https://boisestate.zoom.us/webinar/register/WN_5npoKLHDQh-d0CNytoSoQA

Presenters: Sarah Shuda and Edward Sisco

Sarah Shuda joined the Material Measurement Laboratory at the National Institute of Standards and Technology (NIST) in August 2024 as a Research Chemist. Sarah has worked in forensic seized drugs for fourteen years as both a practitioner and a researcher. Her prior experience was with NMS Labs and the Center for Forensic Science Research and Education.



Ed Sisco has been a research chemist within the Materials Measurement Science Division since 2014 conducting research focused on the use of mass spectrometry for forensic science, public health, homeland security, and other related applications. His current research efforts are focused on i) developing efficient, objective measurement solutions to enable the detection, identification, and monitoring of illicit drug contents in forensic science, public health, and public safety settings, ii) providing fundamental chemical measurements to stakeholders to assist in addressing the opioid epidemic, and iii) lowering the barriers for implementation of new technologies for illicit drug analysis.

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11:00 AM MST/1:00 PM EST

FLOW VISUALIZATION AND SCIENTIFIC IMAGING TOOLS FOR STUDYING THE AEROSOLIZATION, TRANSPORT, AND ULTIMATE FATE OF DRUG CONTAMINATION

This presentation will provide an overview of the NIST program in trace detection and forensic chemistry, with an emphasis on the role flow visualization and scientific imaging tools play in improving processing and sampling of chemical threats.

NEW INITIATIVE: Studying spread of contamination during manufacturing of homemade explosive devices, illegal drug mixtures, and other hazardous agents.

TECHNIQUES USED: Laser light sheet imaging to visualize airborne particulates, wireless air particle sensors for real-time monitoring, and forensic surface analysis to track contamination spread.

GOAL: Provide tools to reduce contamination risks and improve safety across forensic and operational environments.

Registration Link: https://boisestate.zoom.us/webinar/register/WN_j1epW9I2SkeTH_7aAzns9Q

Presenter: Matthew Staymates

Matt Staymates is a fluid dynamicist and mechanical engineer at NIST, specializing in unique flow visualization metrology that supports chem/bio detection efforts at NIST.