# Virtual Workshop Series:
# 3D Firearm Imaging

**August 21, 2024**
2:00 – 3:30PM ET

**Session 1: Introduction to 3D Firearm Microscopy, Instrumentation, and Measurement Practices**
Xiaoyu Alan Zheng, National Institute of Standards and Technology
Rachael Gominsky, Federal Bureau of Investigation

**Session Overview:** 3D Firearms imaging systems are becoming more commonplace in forensic laboratories. While they provide improved imaging and analysis, there are new considerations examiners need to be aware of when using these systems. In this session, attendees will understand the features and capabilities of scanning technologies and how they capture and process images of firearms and ballistic evidence with both precision and accuracy. This session will cover instrument methodologies, limitations of 3D data, and best practices for implementation. Participants will explore the application of control charts as a powerful tool for monitoring and maintaining the quality of imaging processes over time. The topics addressed will help ensure that the data generated are accurate and suitable for toolmark analysis.

**August 28, 2024**
2:00 – 3:30PM ET

**Session 2: Validation Standards and Technical Working Group for 3D Toolmark Technologies (TWG3D2T)**
Todd Weller, Weller Forensics
Xiaoyu Alan Zheng, National Institute of Standards and Technology

**Session Overview:** This presentation will provide an overview of validation, focusing on systems designed to measure and compare microscopic toolmarks on fired ammunition (e.g., bullets and cartridge cases). Rather than offering a protocol or step-by-step guide, the talk will instead address practical considerations and metrics to consider for validation. The goal is to make the concept of validation more approachable and less intimidating for participants. Attendees will also be introduced to the latest standards from the Organization of Scientific Area Committees (OSAC) and relevant documents from the Technical Working Group for 3D Toolmark Technologies (TWG3D2).

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**September 4, 2024**
2:00 – 3:30PM ET

**Session 3: Casework Efficiency, LIMS Integration, and Workflow Configurations**
Alexander Luby, Unified Forensic Laboratory

**Session Overview:** The Cadre Forensics TopMatch-3D High-Capacity Scanner captures high resolution three-dimensional scans of fired cartridge cases and test fired cartridge cases. This presentation will cover the Unified Forensic Laboratory's validation of the Cadre Forensics TopMatch-3D High-Capacity Scanner and NIBIN triaging algorithm. This discussion will focus on their use in evaluating and classifying fired cartridge cases and test fired cartridge cases for entry into National Integrated Ballistic Information Network (NIBIN). Additionally, the presentation will explore the practical integration of the Cadre Forensic TopMatch-3D High-Capacity Scanner and NIBIN triaging algorithm for use in NIBIN casework, highlighting best practices, challenges, and solutions.

**September 11, 2024**
2:00 – 3:30PM ET

**Session 4: Testimony and Admissibility**
Raymond Valerio, Queens County District Attorney's Office
Erich D. Smith, Federal Bureau of Investigation

**Session Overview:** Attendees will gain a comprehensive understanding of the current legal standards governing the admissibility of scientific evidence, with a focus on the challenges that emerging 3D firearm imaging technologies may face. The session will cover key topics such as Federal Rule of Evidence 702, the Daubert and Kumho standards for admissibility, and the methodologies behind Light Comparison Microscopy (LCM) and Virtual Comparison Microscopy (VCM). Discussions will also address the complexities of presenting statistical evidence in the courtroom. Additionally, participants will explore a real-world case flow using virtual comparison for firearms evidence, including insights into the development of this process, how it has been applied, and lessons learned from courtroom testimony.