

FORENSIC SCIENCE

“THE USE OF A MEDICAL LABORATORY SCIENTIST”

2024 ROBERT & JEAN ADAMS MEDICAL & CLINICAL LABORATORY SCIENCES SYMPOSIUM



ADAM GROOMS, FA-AFTE, MLS (ASCP)

FORENSIC SCIENTIST

2024 ROBERT & JEAN ADAMS MEDICAL & CLINICAL LABORATORY SCIENCES SYMPOSIUM

OBJECTIVES



Demonstrate how an MLS degree assists in preparation for a career in forensic science

Compare and contrast testing in the clinical laboratory vs forensic laboratory

Identify ways for Medical Laboratory Scientist to pursue a career in a forensic science laboratory

DEMONSTRATE HOW AN MLS DEGREE ASSISTS IN PREPARATION FOR A CAREER IN FORENSIC SCIENCE



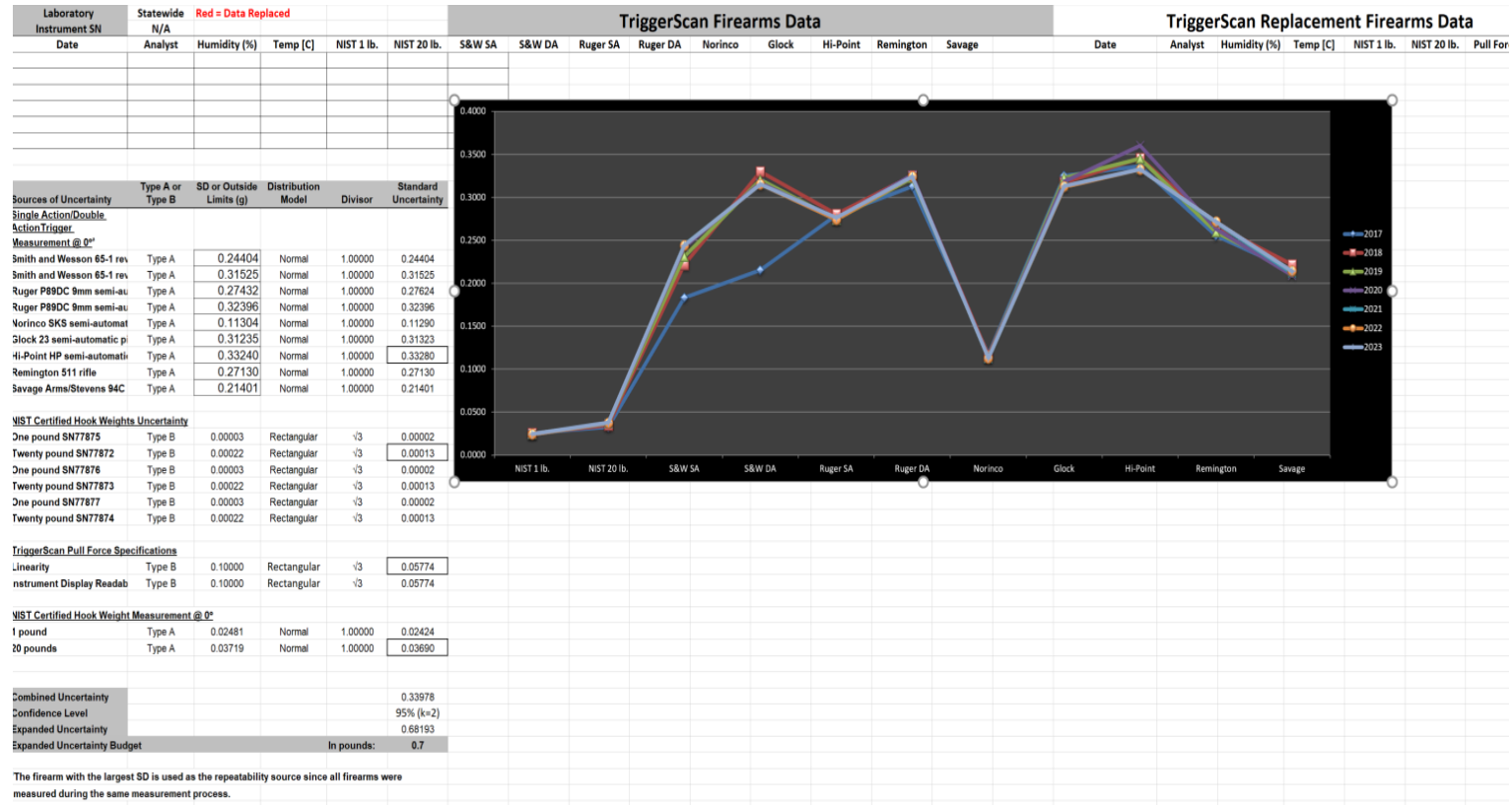
Coursework and Laboratory Exp.

Understanding Quality Assurance (QA)

Validation and Quality Control of instrumentation

COURSEWORK AND LABORATORY EXP.

- Coursework
 - Statistics
 - Laboratory Math (UoM)
 - Confidence Level (K-1, K-2, K-3)
 - Levy Jennings Charts
- Laboratory Experience
 - Multi-task in laboratory
 - 6-month rotations at the Hospital
 - Quality Assurance and Quality Control



QUALITY CONTROL

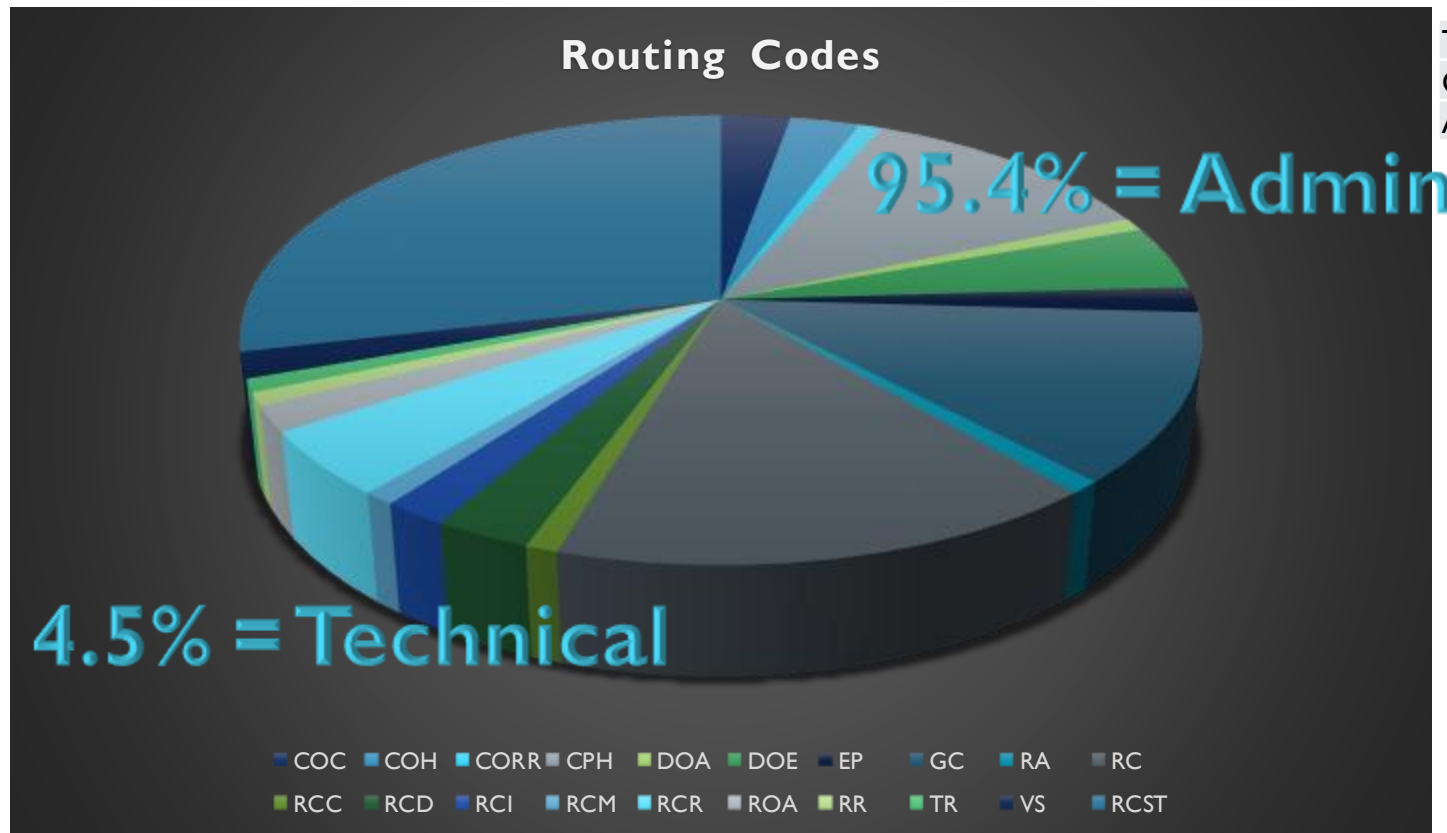
“QUARTERLY CASE REVIEW DATA”



COC	correction(s) to chain of custody
EP	correction to the Examination Performed
RCM	correction(s) to the method (example: Methodology Technical)
ROA	correction(s) to the Results of Analysis (example: “Technical” Conclusion or Opinion change)

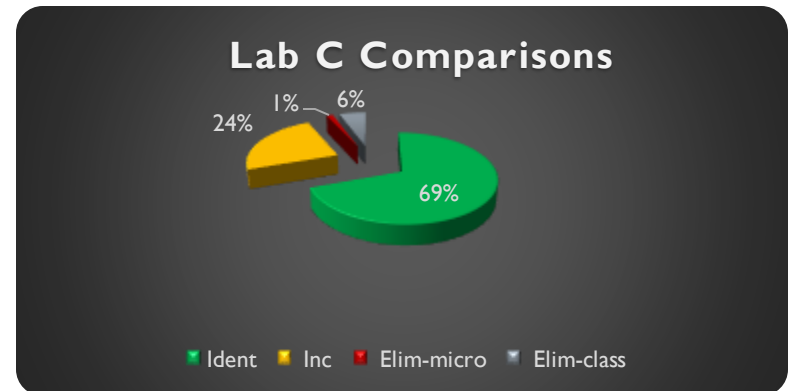
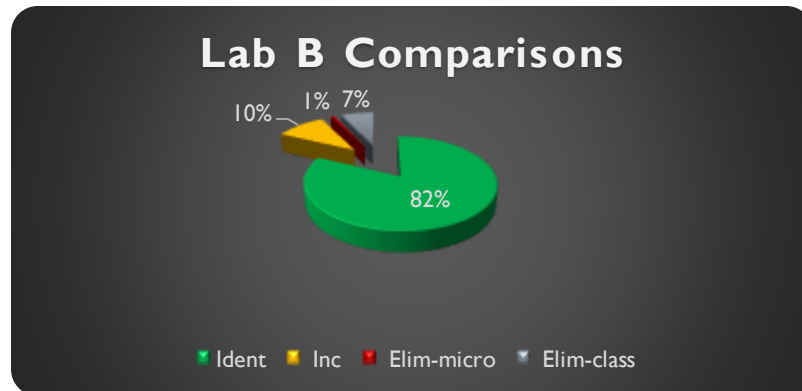
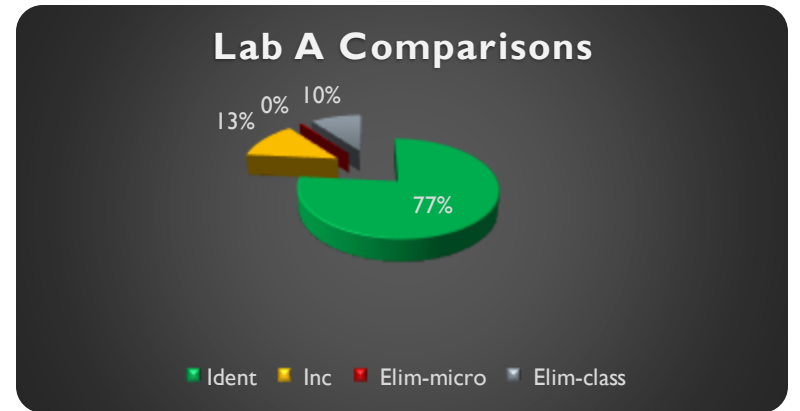
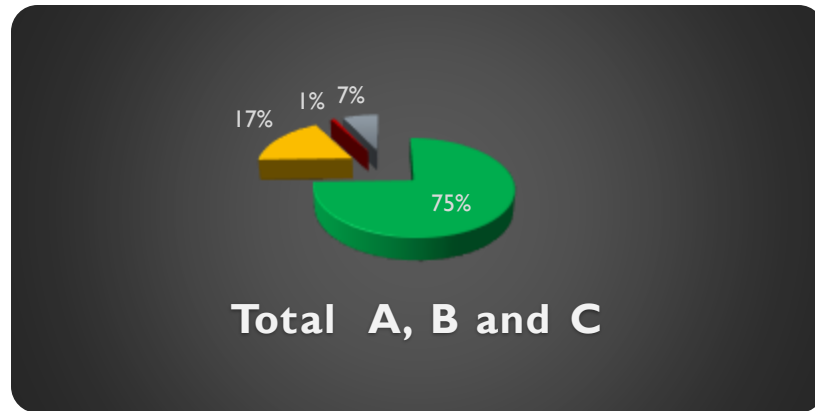
Total Errors	88
Technical	4
Percent	4.545454545
Admin	84
Percent	95.45454545

Total Cases		1.21%	%
Case Count	1157		
Amended	14		



LABORATORY COMPARISON MICROSCOPE DATA

Total Cases	Total IDs	%	Total INCs	%	Elim-micro	Elim-class	% micro	% class	Total Comp
366	2399	74.5%	564	17.5%	29	227	0.9%	7.1%	3219

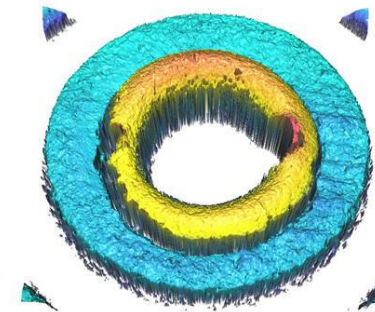


VALIDATION OF EQUIPMENT

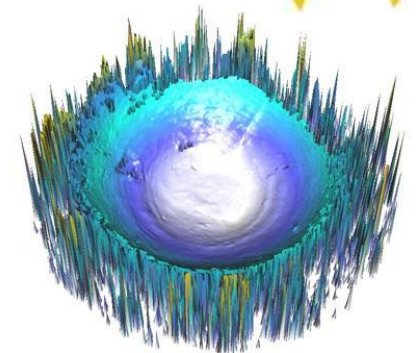
- Instrumentation check
 - Controls and calibrations
- Performance Checks onsite
- Standard Operating Procedures (SOP)
 - Maintenance and standards
 - Accreditation Standards I 7025
 - NIST OSAC guidelines
- Scientific Method
 - Hypothesis, test, gather data, form a conclusion



Bullet Land Engraved Area



Breech Face Impression



Firing Pin Impression

COMPARE AND CONTRAST TESTING IN THE CLINICAL LABORATORY VS FORENSIC LABORATORY



Instrumentation and Types of analytes/specimens

Testing Procedures and analysis

Reporting of the data (Lab Reports)

INSTRUMENTATION AND TYPES OF ANALYTES/SPECIMENS

- INSTRUMENTATION

- Forensic Firearms Lab



- Clinical Laboratory Blood Bank Section

D testing (NEO Iris)*

specific antibodies

istry Section

cology – GCMS, HPLC

g Analysis – DART, FTIR and GCMS

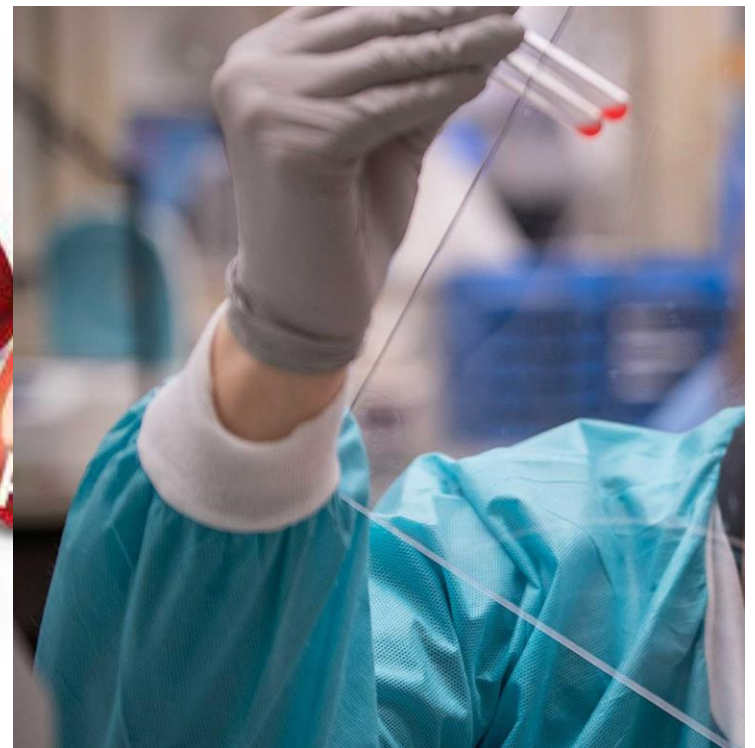
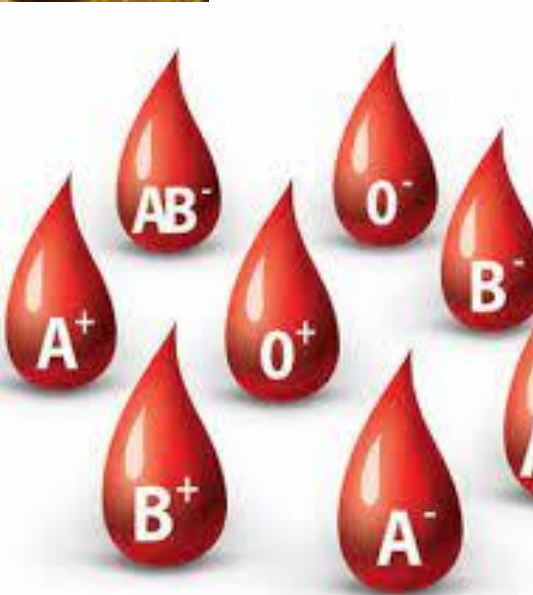
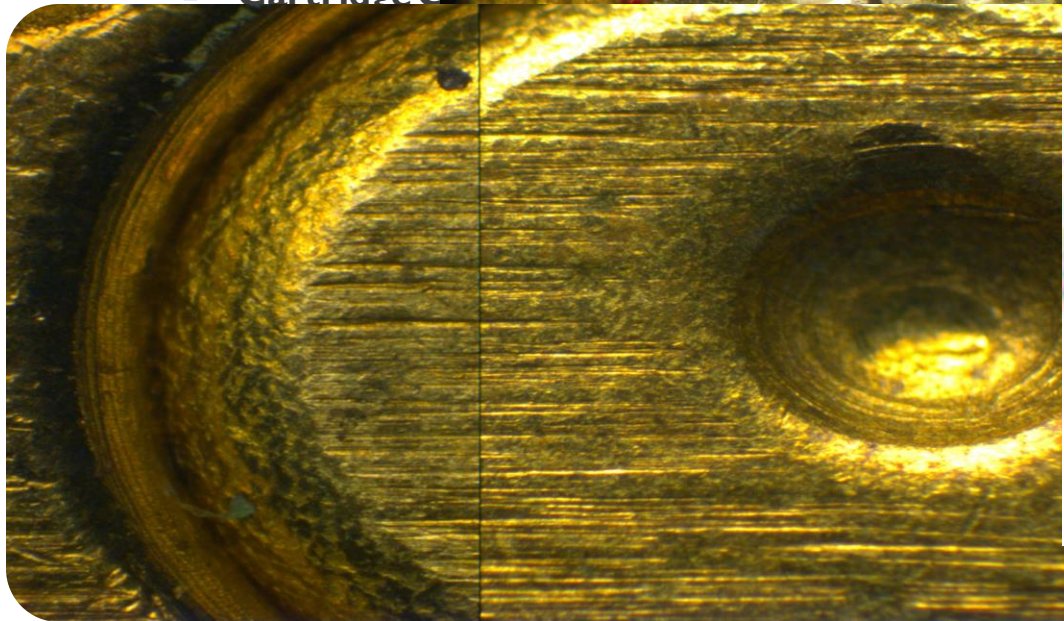


TESTING PROCEDURES AND ANALYSIS

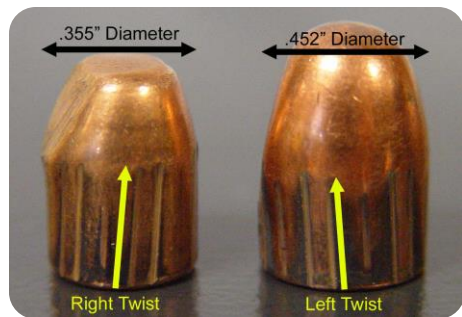
- TESTING SPE

- Comparison

- Cartridge C

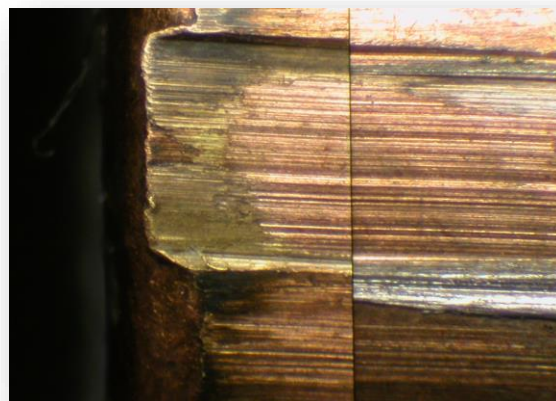
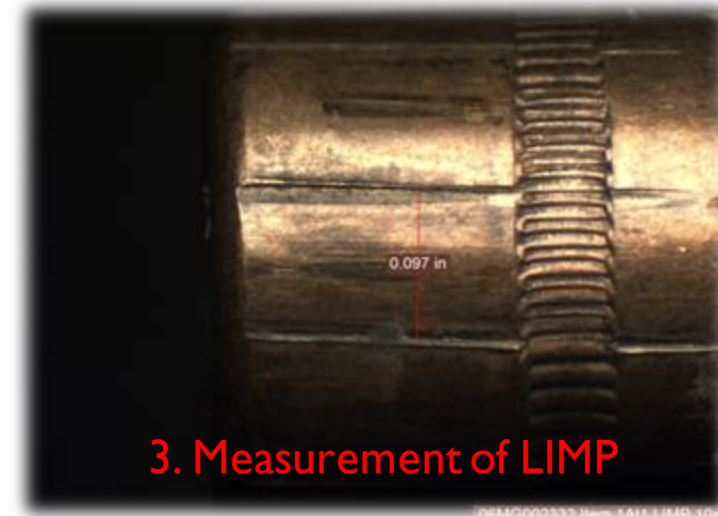


TESTING PROCEDURES BULLET ANALYSIS

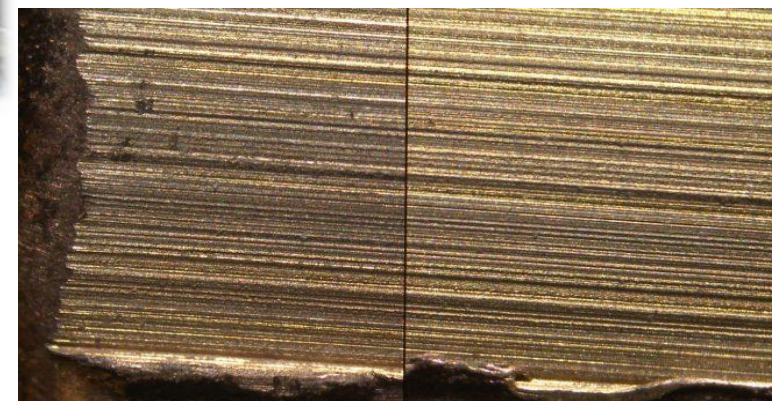


1. Class Characteristics

2. Place on Microscope



4. Individual Characteristics



TESTING PROCEDURES AND ANALYSIS



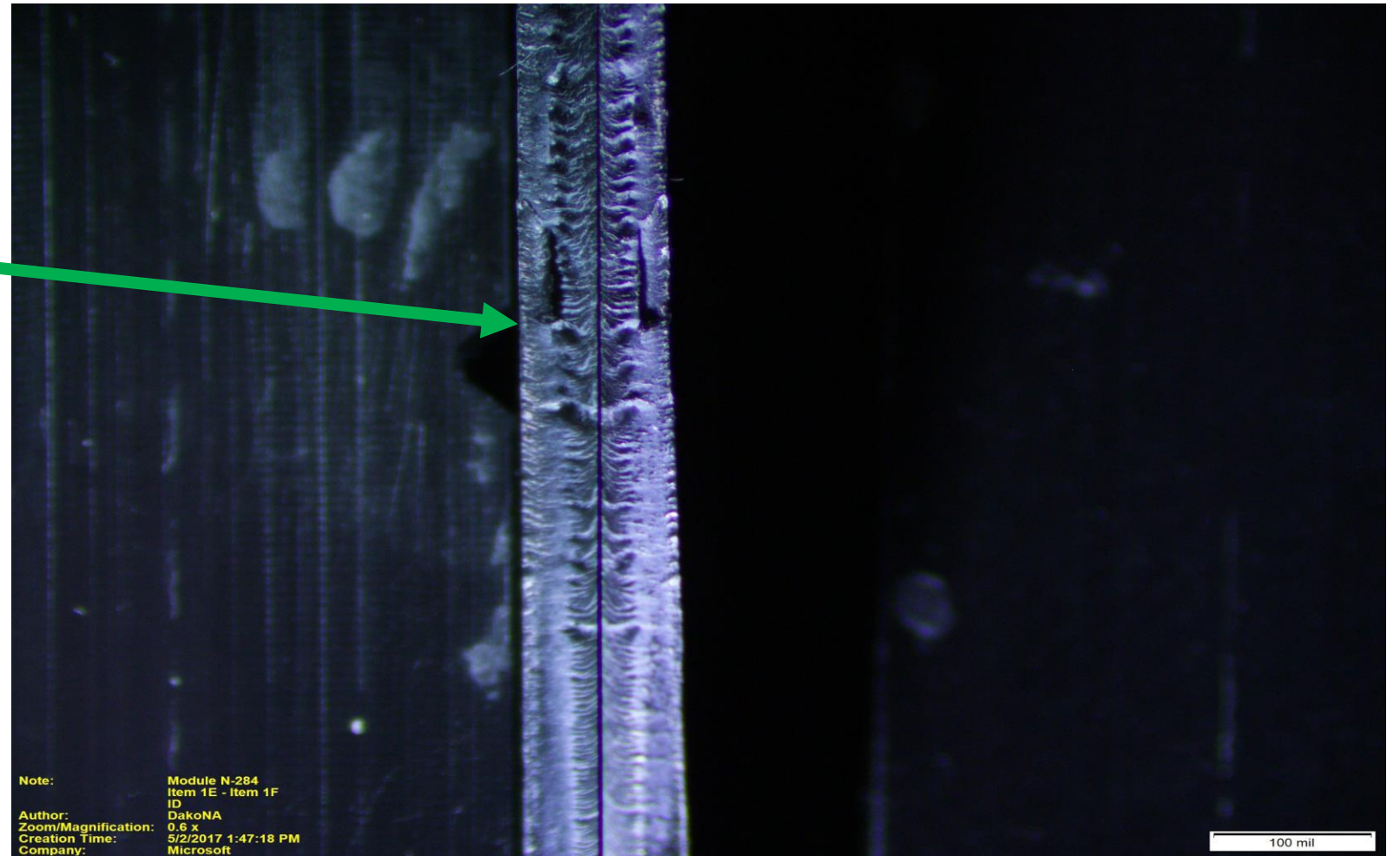
Alabama Department of Forensic Sciences Firearms/Tool Marks Section

Item 4B - Item 4D

Fracture Analysis

Adam Grooms
Forensic Scientist

FRACTURE MATCH TESTING AND ANALYSIS



ANALYSIS OF A CARTRIDGE CASE



Firearms and Toolmarks | NIST

Video Credit: NIST Forensic Science Program



ANALYSIS OF A FIRED BULLET

Firearms and Toolmarks | NIST

Video Credit: NIST Forensic Science Program



REPORTING O

Patient Report

Specimen ID: 256-Y51-5073-0 Acct #: 45746442 Phone: (703) 971-7633 Rte: VY
 Control ID: PRO1490710 CAPITAL WOMENS CARE

LASTNAME, FIRSTNAME M.
 3060 S. CHURCH ST
 BURLINGTON NC 27215
 (336) 436-8169

INTERFACE ACCOUNT
 6355 WALKER LANE #508
 ALEXANDRIA VA 22310

Patient Details	Specimen Details	Physician Details
DOB: 06/10/1972	Date collected: 09/12/12 1117 ET	Ordering: MSTAS
Age(y/m/d): 028/01/10	Date entered: 10/03/12	Referring:
Gender: F SSN: 999999999	Date reported: 10/03/12 1142 ET	ID:
Patient ID: 1234567890		NPI:

this report are based upon direct analysis, measurements, and by the scientist performing the technical and administrative

General Comments & Additional Information
 Clinical Info: Check for Specimen ID

Ordered Items
 Comp. Metabolic Panel (14)

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	LAB
Comp. Metabolic Panel (14)					
Glucose, Serum	75		mg/dL	65 - 99	01
BUN	20		mg/dL	5 - 26	01
Creatinine, Serum	0.85		mg/dL	0.57 - 1.00	01
Glom Filt Rate, Est	>59		mL/min/1.73	>59	
IF African-American	>59		mL/min/1.73	>59	
Note: Persistent reduction for 3 months or more in an eGFR <60 mL/min/1.73 m2 defines CKD. Patients with eGFR values >/=60 mL/min/1.73 m2 may also have CKD if evidence of persistent proteinuria is present. Additional information may be found at www.kdoqi.org .					
BUN/Creatinine Ratio	24			8 - 27	
Sodium, Serum	135		mmol/L	135 - 145	01
Potassium, Serum	4.1		mmol/L	3.5 - 5.2	01
Chloride, Serum	105		mmol/L	97 - 108	01
Carbon Dioxide, Total	28		mmol/L	20 - 32	01
Calcium, Serum	9.1		mg/dL	8.5 - 10.6	01
Protein, Total, Serum	6.2		g/dL	6.0 - 8.5	01
Albumin, Serum	4.3		g/dL	3.5 - 5.5	01
Globulin, Total	1.9		g/dL	1.5 - 4.5	
A/G Ratio	2.3			1.1 - 2.5	
Bilirubin, Total	0.3		mg/dL	0.1 - 1.2	01
Alkaline Phosphatase, S	75		IU/L	25 - 150	01
AST (SGOT)	10		IU/L	0 - 40	01
ALT (SGPT)	5		IU/L	0 - 40	01

01 CB LabCorp Dublin Dir: Modina Thraasher, MD
 6370 Wilcox Road, Dublin, OH 43016-1296
 For inquiries, the physician may contact Branch: 800-222-7566 Lab: 614-889-1061

using the submitted magazine, Item 2B, and laboratory manila envelope and will be returned with the evidence to the

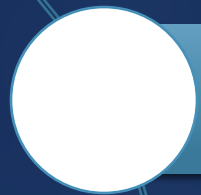
ccessfully using the submitted magazine, Item 3B, and sealed in a manila envelope and will be returned with the

am 3A, the Smith & Wesson pistol, based upon corresponding

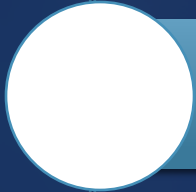
on the diameter. These items were too damaged for any further

characteristics found in (but not limited to) the following ith & Wesson 9mm Luger caliber firearms.

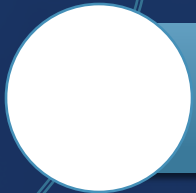
IDENTIFY WAYS FOR MEDICAL LABORATORY SCIENTIST TO PURSUE A CAREER IN A FORENSIC SCIENCE LABORATORY



Coursework (Elective Classes)



Internships within Forensic Laboratory

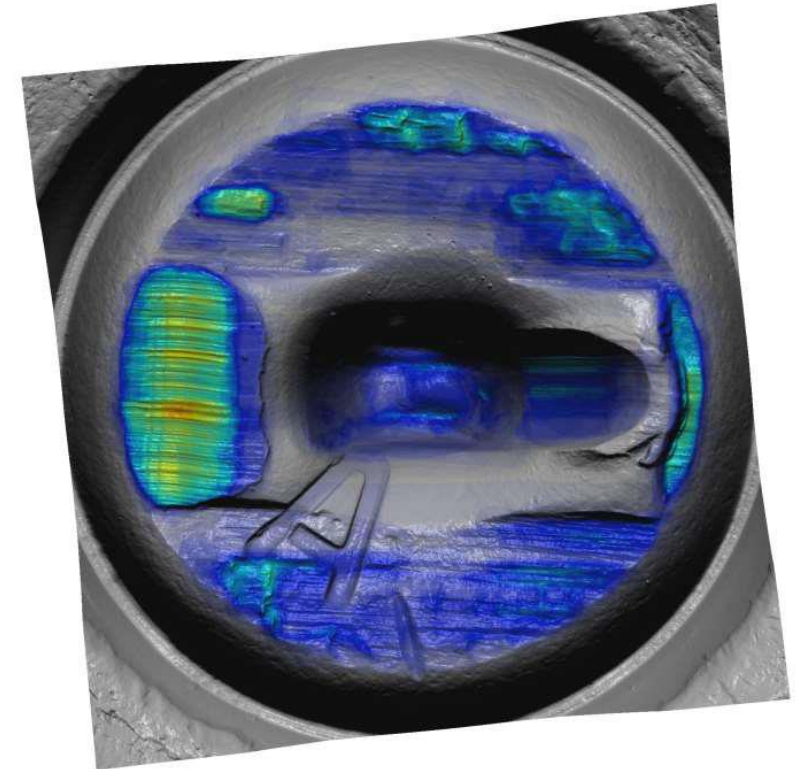


Professional Organizations

COURSEWORK (ELECTIVE CLASSES)

- **Elective Courses for Forensic Science**

- **Biology/Physical Science Degree (BS or MS)**
- **Statistics**
 - UoM, Validation, T-test, Standard Deviation
- **Forensic Biology**
 - Molecular Biology
 - Biochemistry
 - Genetics



INTERNSHIPS WITHIN FORENSIC LABORATORY

- **INTERNSHIP ADVANTAGES**
 - **Laboratory Experience**
 - **Explore types of testing**
 - **Learn day-to-day operations**
 - **Management can determine ability**
 - **Extended interview**



PROFESSIONAL ORGANIZATIONS

Get Involved with Organizations

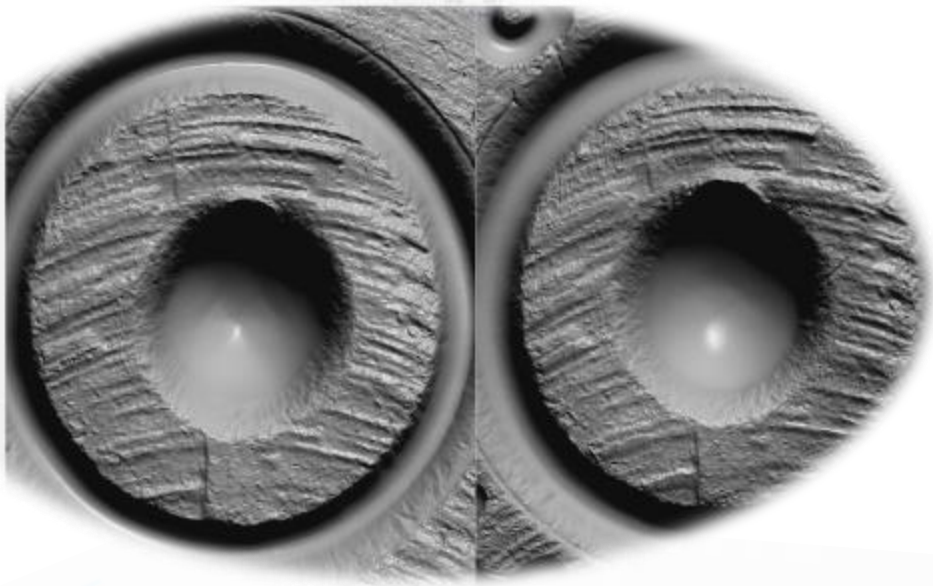
- American Academy of Forensic Sciences (Student Affiliate)
- Southern Association of Forensic Scientists
 - Student Affiliate
- Alabama State Association of Forensic Sciences
 - Affiliate Member
- Present research from school programs
- Networking opportunity



Southern Association of Forensic Scientists



The screenshot shows the ASAFS website with a navigation bar including Home, Annual Meeting, Committees, About, Membership, Contact, and Login. The main content area is titled 'RETIREMENT' and 'AFFILIATE' with detailed text regarding membership criteria. Below this is a section for 'Benefits of ASAFS Membership' with a green 'Online Application' button. The benefits listed are: Resume and CV enhancement, Networking opportunities, Talking point for future job interviews, and Potential access to future ASAFS sponsored awards. The page is decorated with images of people working together at computers.



THANK YOU

