ADFS

Employee Newsletter

Year 2010 Issue 1

this issue

Message from the Director

Greetings: As we move into 2010 everyone is to be complimented with regard to frugal spending practices. We completed the first quarter with a little money to spare. The budgetary vigilance we have exhibited as an agency is to be celebrated and will be necessary in the future.

Plans for ISO training are finalized and ready for implementation. I encourage all employees to be familiar with these standards and to facilitate their adoption. January 1, 2012 is the targeted completion date.

Departmental backlogs in Chemistry, Toxicology and Pathology remain low. Congratulations to those sections! Biology continues to monitor the effectiveness of their new approach as their backlogs show a recent trend downward. Firearms is holding ground as we retool and train new examiners.

Building projects continue to move forward with the HV and MB Biology renovations both complete. USA property for renovation is identified with purchase terms approved in principal. Negotiations continue. Auburn HQ and Lab project should go out for bids during March. The search for new accommodations continues in TU.

The 2010 Legislative session began Jan. 12. ADFS will not have a sponsored bill this year. Two amendments put forth by ADFS were added to the ignition interlock bill and it was again passed out of committee in the House. I will monitor pending legislation to identify any possible unfunded mandate for our Department. If you are aware of a bill that mentions us, please forward an e-mail to me that includes the bill number or sponsor so that I might review it for possible effect on ADFS.

Every policy, goal and achievement is to make ADFS the preeminent Forensic Science provider in this country. Take pride in where and with whom you work. The best is yet to come!

Mike.

NamUs Funding

The National Missing and Unidentified Persons System (NamUs) has instituted a pilot project of reimbursing offices for cases entered into the system. If you or your office has entered cases according to NamUs requirements then you should receive notification of such and possibly a check. Any check received should be forwarded to the Death Investigation Quality Manger. The money will be used for Death Investigation personnel training and education.

ADFS Leads the Way

The Biology Section of ADFS is the first Agency worldwide to validate a revolutionary DNA identification kit called 'Identifiler Direct' which will allow for direct amplification of arrestee and offender samples, allowing for improved efficiency to laboratory operations as the new arrestee law becomes implemented. ADFS is also the sponsoring Agency to the FBI for this technology and has submitted the validation data to the FBI for it to be considered for acceptance in the National DNA Index System, a testament to the Biology Section's continued role as a national leader.

ADFS

Employees Making a Difference

Girls' Conference Features Options for Future Careers

Singleton-Rickman, Lisa. Times Daily. "Girls' conference features options for future careers", http://www.timesdaily.com/article/20091011/ARTICLES/910115026/1011/NEWS?Title=Girls-8217-conference-features-options-for-future-careers

FLORENCE - High school girls from northwest Alabama will attend the second annual Girls Can! conference Thursday at the Marriott Shoals Conference Center.

The conference showcases careers for women, including non-traditional areas of the work force where women are making an impact.

Liz Anderson, an event organizer, said 2008's conference was so successful it is returning. There will be 350 juniors and seniors in attendance this year from high schools in Colbert, Franklin, Lauderdale, Marion and Winston counties.

"The idea of the conference is to present in an interesting, very real format many non-traditional jobs for females," she said. "The girls are at an age that they're thinking about their futures, their careers and they benefit by seeing what jobs are out there."

The event will host 54 speakers, all of whom are young women in non-traditional careers such as civil, electrical, chemical and mechanical engineering, doctors, dentists, forensic scientists, radiologists, professional pilots and government officials.

The conference will begin with an opening session by motivational speaker Joyce Brooks, area manager for Alabama Power Co. Students will then have the opportunity to visit up to three roundtables with careers and mentors in their areas of interest.

Sheffield High School guidance counselor Melissa Ryan said 11 girls from her school will attend, all of whom are juniors.

"I want these girls to think differently about their career opportunities and not just look at the traditional career path," Ryan said. "This confirms that women can do anything they want and it opens up opportunities to these students that they've not previously considered."

Each girl attending receives a backpack and T-shirt.

The project has won a national award from the National Association of Development Organizations and a regional award for innovation from the Valley Innovation Alliance in Huntsville.

The event is sponsored by the North Alabama Council of Local Governments and the Shoals Chamber of Commerce. Funding is through a grant from the Workforce Innovation and Regional Economic Development.

Tiffany Warren
Drug Chemist
Florence Laboratory

Tiffany Warren representing ADFS at the 2nd Annual "Girl's Can" Career Conference at the Marriott Conference center in Florence on October 15, 2009. It is a conference that sponsored 350 high school senior girls from all over Northwest Alabama exposing them to women in the medical, engineering, and science fields. Tiffany represented our department very well giving the girls insight and advice in the area of Forensic Science as a career choice.

Submitted by Kim Ross, Section Chief

Figure 1.

Expert Trigger Pull Uncertainty

Sevigny, D. and J. Salyards. Forensic Magazine. "Expert Trigger Pull Uncertainty." December 2009/January 2010.

ISO 17025 requires laboratories to document how uncertainty was calculated. Find out ways to become more comfortable with your uncertainty calculations.

In this article, we will address some questions about calculating uncertainty by using trigger pull measurements as an example. You don't have to be a firearms examiner to understand the article. In fact, we chose this example over other measurements common to forensic labs, like quantitative drug analysis, because trigger pull is a fairly straight forward measurement. For our experiment, we used the setup displayed in Figure 1.

The readout from the measuring device, a Lyman Electronic Trigger Pull, is showing 5 lbs 11.5 oz. This measurement raises several questions. For example:

Question 1: If you took just one measurement, is it okay to report the trigger pull as 5 lb 11.5000 oz?

Most of you probably said "no" because you recognized that the trigger pull device does not give us any information about those trailing zeros after the 11.5. We don't know what those numbers actually are.

Question 2: Is the right answer more like: Trigger Pull = 5 lbs 11.5 oz ± 0.05 oz?

If you answered yes, you are getting warmer. However, as we will see in a moment, the real calculation of uncertainty is a little more complicated and interesting.

Finally, let's pose one last question.

Question 3: What if we took several measurements; should we use the high and low value to get an answer like: Trigger pull range = 5 lb 1.5 oz – 6 lb 6.0 oz ?

This approach makes some intuitive sense, but it is not quite right. If you have been exposed to formal calculations of confidence intervals and uncertainty values, then you may have already made friends with the [Bell Curve] equation in Figure 3. Two rules [Law of Large Numbers and Central Theorem] tell us that if we take multiple measurements of anything, the average of those measurements will tend towards the actual average value of the thing you are trying to measure—in our case, trigger pull. And if you were to graph how your measurements are distributed, it would look a lot like a Bell Curve. We are using a variation of the Normal Distribution called a Student's t Distribution.

Turning our attention to the data in Figure 2, we see a similar pattern. Fifteen of the values fall in the 5 lb 10.0 oz – 6 lb 5.0 oz range while only five fall outside of this range. Figure 4 shows what happens when we apply the equation in Figure 3 to the data in Figure 2.

This result tells us that there is a 99.8% chance that the actual trigger pull average value is between 5 lb 11 oz – 6 lb 3 oz. (You might be wondering why we also rounded the numbers in the final answer. Since ± 4.352 oz tells us our uncertainty is at least 4.3 oz, it does not make sense to include numbers that suggest more precision.) To review how this number was calculated, let's take a look at each of the variables and parameters in the uncertainty equation.

One interesting consequence of this equation is that the more measurements you take the smaller the uncertainty becomes. This result is true even if you are using a really imprecise measuring technique.

One important note is that uncertainty, the Law of and the Central Limit Theorem all have to do with

Figure 2.

Trigger Pull Raw Data (pounds-ounces)

6-6.0	6-6.0	6-4.0	6-4.0
6-3.5	6-3.0	6-2.5	6-2.0
6-1.5	6-1.0	6-0.0	5-13.5
5-13.0	5-11.5	5-11.5	5-11.0
5-11.0	5-9.0	5-9.0	5-1.5

Figure 3.

Equation for Calculating Uncertainty

$$\mu = \overline{x} \pm \frac{t\,s}{\sqrt{n}}$$

where,

μ is the actual average value of the thing we are trying to measure

x is the average of all the measurements we made (for this example 95.025 oz)

t we must decide 95%, 99%, or 99.8%; then t-table gives us the number to plug in for t

http://www.itl.nist.gov/div898/handbook/eda/section3/eda3672.htm

s is the standard deviation of all your measurements; the instrument your using may have a published value for this variable

n is the number of measurements taken minus one

Figure 4.

Trigger Pull Results with Uncertainty at 99.8% Confidence Interval

5 lb 15.025 oz ± 4.352 oz

Rounds to 5 lb 15 oz ± 4 oz

Figure 5.

Systemic Error

5a. 45° pull angle 5b. 0° pull angle

Figure 6.

45° Angle—Trigger Pull Raw Data (pounds-ounces)

5-10.0	5-6.0	5-4.5	5-3.5
5-3.0	5-3.0	5-3.0	5-2.5
5-2.0	5-2.0	5-1.5	5-1.0
4-15.9	4-15.2	4-15.1	4-15.0
4-14.7	4-14.4	4-14.1	4-13.3

Figure 7.

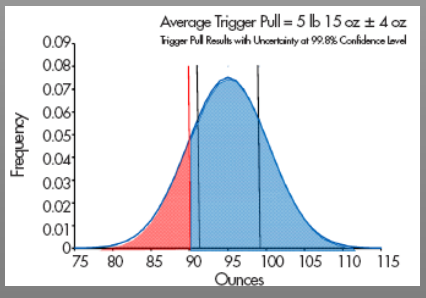
Trigger Pull Results for 45° Data with Uncertainty at 99.8%

5 lb 1.585 oz ± 2.530 oz

Rounds to 5 lb 2 oz ± 3 oz

Figure 8.

Probablity of Measuring Less Than 5 lb 10 oz



To read this article in its entirety go to

www.forensicmag.com/Article_Print.asp?pid=308

random error. We can limit the effects of random error in several different ways. If we have a really good instrument, perhaps a precision scale to measure trigger pull, our *s* will be smaller.

If we take a lot of measurements, then our *n* gets bigger. And if we are willing to accept a lower level of confidence (i.e., 95%instead of 99.8%), then our *t* gets smaller. The effect of any of these changes makes our reported uncertainty smaller.

There is another type of error that is not random. What if our firearms examiner changed the way the measurement was collected and instead of pulling straight back she angled the instrument 45° down as indicated in Figure 5? In this case we would get a new set of measurements as indicated in Figure 6 and our final answer would look something like Figure 9.

Please note that the uncertainty measurement has not changed significantly, but the average value of the measurements has shifted. Uncertainty or random error can never be fully avoided. However, systemic error is caused by some mistake or flaw in the experiment. And these errors can and should be corrected.

Complying with Requirements

Probably the most important question for forensic laboratory directors, and examiners is, "how does all of this affect my operation and our accreditation?" ISO17025, Section 5.4.6.2 states: Testing laboratories shall have and shall apply procedures for estimating uncertainty of measurement. In certain cases the nature of the test method may preclude rigorous, metrologically and statistically valid, calculation of uncertainty of measurement. In these cases the laboratory shall at least attempt to identify all the components of uncertainty and make a reasonable estimation, and shall ensure that the form of reporting of the result does not give a wrong impression of the uncertainty. Reasonable estimation shall be based on knowledge of the performance of the method and on the measurement scope and shall make use of, for example, previous experience and validation data.

John Neuner, International Program Manager for the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) reminds us that their ISO17025 Accreditation Program does not require laboratories to include the uncertainty measures in the report. Instead, laboratories are required to have appropriate documentation available in the laboratory that explains how uncertainty was calculated. He also reminds us that uncertainty of measurement can be calculated for the measurement method, and the uncertainty of the method can then be applied to each case worked. The ASCLD/LAB International Program also has a white paper on Estimating the Uncertainty that spells out six key steps to complying with this requirement. More information can be found at www.ascld-lab.org.

Randall Robbins, Manager of Accreditations, Forensic Quality Services – International (FQS-I) agrees that the exam documentation needs to show how the uncertainty calculations were made. He also would invite us to review the FQS-I Website for an Uncertainty of Measurement Presentation at: www.forquality.org/FQS-I%20Presentations/UM%20 podcast%20slides_files/frame.htm.

The Scientific Working Group for Firearms and Toolmarks (SWGGUN) published a white paper, Transition from ASCLD/LAB Legacy to ISO/IEC17025, in October 2008. Section 2.2.4 gives a variation of the type of uncertainty analysis described in this article:

The statistical spread results in a series of measurements may yield, through its standard deviation, a measure of the uncertainty. This could be achieved by having all examiners within their unit take test measurements, collecting the aggregate data, and then having standard deviations calculated (this procedure will incorporate instrumentation errors). A plus or minus figure could be assigned to a measurement based on one or two standard deviations from the mean.

Presenting Findings

Perhaps the most important issue is to decide the best way to present your results in a report. Professional ethics demand that we take great effort to present clear, unambiguous findings that cannot be easily misrepresented by either the prosecution or the defense. In this case you may want a report that says:

The average trigger pull for the 9 mm Beretta pistol (Tag 001) was determined to be: 5 lb 15 oz ± 4 oz (with 99.8%confidence). Data used for the ± uncertainty calculation are available upon request from the laboratory.

Another ethical issue is deciding which confidence level to use. Many researchers consider 95%to be the conventional standard. Scientific Working Groups are in a good position to publish guidance about what confidence level to use for a specific experimental technique. We used 99.8% in this article to lend support to the idea that forensic case work should meet a high standard.

One final caution—be careful about the math involved in answering specific questions. In a typical court case involving a shooting, the prosecution may have a suspect who can only fire a weapon that has a trigger pull of less than 5 lbs 10 oz (or 90 oz). She wants to know the chances of getting that result. Based on our 99.8% confidence level that the average value is 5 lb 15 oz (or 95 oz) ± 4 oz, can we conclude that there is less than a 0.2% (or 2/1000) chance of measuring the trigger pull to be 5 lb 10 oz? The answer is a resounding "NO!" Figure 8 illustrates the problem. This new question is actually, "What are the chances of getting a measurement in the red, as opposed the blue, shaded area?"

To rigorously calculate a mathematical answer, we need to make a few assumptions, but we can eyeball the graph and reach a fairly accurate conclusion. We will get measurements less than 5 lb 10 oz about 16% of the time (a lot different than the 0.2% we may have been tempted to report).

About the Authors

Dana Sevigny is Firearm Examiner with the U.S. Army Criminal Investigation Laboratory. She has a BS in Chemistry from Emory University in Atlanta, and an MS in Forensic Science from Virginia Commonwealth University. She completed the Bureau of Alcohol, Tobacco, Firearms, and Explosives National Firearm Examiner Academy in 2003. She has worked in crime laboratories in Vermont and Georgia as a Firearms Examiner, and she is a member of the Association of Firearms & Toolmarks Examiners. She can be reached at dana.sevigny@us.army.mil.

Jeff Salyards is the Program Manager for Science &Technology at the U.S. Army Criminal Investigation Laboratory. He holds a PhD in Chemistry from Montana State University, a MFS from George Washington University, and has completed a Fellowship in Forensic Medicine from the Armed Forces Institute of Pathology. A former director of the Defense Computer Forensic Laboratory, he has 21 years of combined experience in investigations, forensic consulting, and teaching. He has served on the Board of Directors for the American Society of Crime Laboratory Directors/Laboratory Accreditation Board, the Department of Justice National Steering Committee for Regional Computer Forensic Laboratories, and the Council of Federal Forensic Laboratory Directors. He can be reached at jeff.salyards@us.army.mil.

announcements

Tommy Bramblett
Chief Fiscal Officer, Headquarters

A Legend Retires.

Mark the date. May 1st as a black day on your calendar. As many of you have already heard the news Tommy Bramblett, our Accounting Director, after many long and productive years has decided to turn his calculator off and head to the house. For his +23 years of state service, Tommy has been a loyal and dedicated member of the ADFS headquarters administration for the last 15 to 16 years. I'm sure you all will agree that he will be greatly missed. His wise counsel and unwavering support for the Agency and its mission has help steer the Agency through good times and bad. Please join me in wishing Tommy all the best in his retirement. Job well done!

Submitted by Rod Kennette

David Myers
Property Officer, Headquarters

David Myers, Property Officer, will be retiring from ADFS on March 1, 2010. His last working day with the department was on February 12, 2010. David joined our ADFS team on November 1, 2008. He has done an outstanding job of organizing the property inventory records. Although David's time with the department has been short, ADFS appreciates David's hard work, achievements, and dedication to the department. We wish David all the best as he leaves ADFS to enjoy his golden years.

Submitted by Kay Wilson

birthdays

January

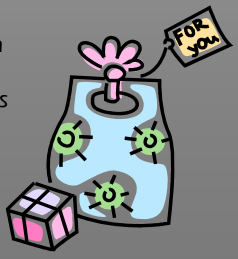
Lisa Cary
Michelle Lloyd
John Dodd
Alberta Young
Adel Shaker
Debra Calhoun
L'Toya Coleman
Patricia Calvert
John Brunner
Ashley Stanford
Sharee Wells
Darlene Williams
Adam Grooms
Donna Naylor

February

Justin Sanders
Michelle Finch
Teryn O'Bannon
Andrea Headrick
Derek Headley
Heather Morgan
Joyce Johnston
Melanie Martin
Scott Belton
Casey DuBose
London Pearce
John Daniels
Jason Kokoszka

March

Keith Busby
Sandra Webster
Christal Prater
Grace Brooks
Tim McSpadden
Glenda Senn
Andrew Gringas
Patrick Goff
Charles Barber
Gary Crowe
Kari Bowen
Tammy Hood
Clara Marshall
Kay Wilson
Alan Fields



new arrivals

No photo available

Georgia Kaylee Knopps
November 11, 2009
7 lbs 7ozs
Buford Lee Knopps, III Mobile DI

Corbin Andrew Prater
January 15, 2010
6 lbs 13ozs 19.5 inches
Christal Prater Mobile DI

Griffin Axel DuBose
January 6, 2010
7 lbs 14ozs 21 inches
Casey Dubose Auburn DC

Logan Parker Sullivan
January 21, 2010
7 lbs 1oz 21-1/4 inches
Dancy Sullivan Birmingham FATM

Take the SUDOKU Challenge!

The goal is to enter a digit into every cell so that each row, column, and the nine 3 x 3 blocks each contain all of the digits from 1 to 9, exactly once.

GAME RULES—
Answers to both puzzles MUST BE submitted by email no later than March 5, 2010 at 5 pm to holli.baker@adfs.alabama.gov.
The winner will be selected at random from the names of all players with the correct answers to both puzzles.

GOOD LUCK!!

	4				3		2	
2		1			4			3
		8			7	5		1
4	1				9			
			6				9	7
7		9	5			8		
1			7			3		4
	6		8				7	

		4					5	2
2			7		5		3	
9			1			6		
3					7	8		
8								6
		1	6					5
		3			6			1
	1		4		9			3
6	2					7		

Training Opportunities

RTI International | Forensic Science Education

Online Forensic Science Continuing Education and Training - RTI International

Introduction to Uncertainty in Forensic Chemistry and Toxicology	On demand & live
SOP Writing for ISO 17025 Accreditation	On demand
Best Practices for Volumetric Measurement	On demand

National Forensic Science Technology Center

Upcoming Events | NFSTC Event Portal

Deadline to register March 7, 2010

Essentials of Crime Scene Investigation Training Program	Pre-requisite online course work & on-site instruction at NFSTC

Professional Development

AAFS Presentations

Forensic Biology

Alison Ethridge, Sue Rogers, and Angelo Della Manna are presenting a poster at the AAFS Annual Meeting in Seattle, titled, " A Comparison of the Extraction of Buccal Cells from FTA Cards Using Magnetic Bead and Organic Extraction Methods"

AFTE Presentations

Firearms and Tool Marks

Derrick McClarin and Derek Headley are presenting at the AFTE Meeting two posters titled, “FTIR-ATR Analysis for Gunpowder Particle Confirmations” and “Preliminary Investigation of Science GL’s 3D Comparator Software to Provide Objective Firearms and Tool Mark Data”