

# The CACNews

News of the California Association of Criminalists • Fourth Quarter 2013



BAKER TO VEGAS • 2013 CHALLENGE CUP RELAY

# The President's Desk

## What it Really Means to be CAC President

As I cruised south down Interstate 5 last week, half-listening to the audiobook on my iPod and half-listening to the animated *Hunchback of Notre Dame* movie that my daughter was watching in the back seat, my brain decided that neither of these two listening options were satisfying and proceeded to wander. This is not an uncommon occurrence for me on that blank stretch of highway. Once I've passed the Pea Soup Andersen's windmill, it is a long way to the foot of those peaks that mark the beginning of the end of the journey to "The Happiest [and most-expensive] Place on Earth," and my mind fell to recalling how, nine months previously, I had been on this same godforsaken road thinking about what I would like to accomplish as CAC president.

I remembered thinking how I would like to make a lasting impact on the CAC. It would not be enough to be simply a steward of the office and bearer of the legendary coconut. No, I wanted to really achieve something beneficial for the organization. I wanted to make some truly remarkable change that would make being a CAC member a complete no-brainer. Whenever someone takes on a role such as this, I suppose they do some form of brainstorming about what positive effect they might be able to leave behind, and I was no different.

It wasn't until my recent two-day jaunt to the land of Mickey, when the smiling, pea-smashing faces of Hap-pea and Pea-wee were in the rear-view mirror, that I had time to evaluate my progress toward the goal of being more than just a custodian of daggers, chaffing dishes, and a tropical fruit/nut/seed that resembles a hairless cranium. The answer? Zero. None. No progress at all. I have written more emails than I thought humanly possible. I managed to meet an article deadline for the last *CACNews*. I even wrote my name on the coconut already just in case I get hit by a streetcar. But I have yet to take even one step toward something great that will cause thousands of criminalists to flood the membership secretary's email with applications or revolutionize the CAC in hitherto unimagined ways. Quite literally a thousand cows flew by my window while I tried to remember if I had ever come up with a great idea to improve the CAC during my tenure as president. It wasn't until after Zoie had finished her fourth movie that I finally gave in to the fact that I had not.

However, it was in that moment that this article practically wrote itself! I had one of those often heard-of but rarely-experienced revelations that appear in the mind completely formed. It was not the solution to cold fusion or the cure for some horrific disease. On the contrary, what occurred to me is that it is rarely an organization's leader that makes the real difference and institutes dynamic change. They can certainly serve

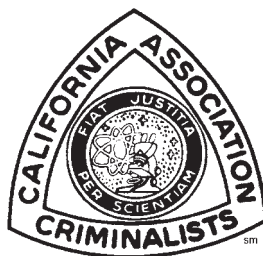
**How relieved I was when I concluded that, as president, I don't need to come up with great ideas! The great ideas are already out there in the brilliant brains of our members and, as I have discovered, our non-members as well.**



Eric Halsing  
CAC President

*please turn to page 4*

FOURTH QUARTER 2013



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The deadlines for submissions are: December 1, March 1, June 1 and August 15.



**Coming next quarter...**  
Robert M. Cooper  
1924—2013

Our last remaining CAC founder passes.

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as a catalyst for positive change. But it is the people by whom those leaders are surrounded that seem to generate most of the ideas from which great things bloom. Perhaps it is obvious, but it didn't occur to me until the hypnotic spell of I-5 combined with the frivolity of the Wreck-It Ralph soundtrack relieved some of the pressure I was feeling to produce greatness.

Consider a few examples of what I am talking about. The Full Member Seminar Lottery that was recently implemented is an idea that came about because I was having lunch with a colleague. I asked her why she is not a member and what the CAC lacks or could provide that would entice her to join our ranks. This one question led to a brainstorming session from which her excellent idea of awarding an all-expenses paid seminar to a randomly-selected member resulted.

Our Policy Statements, while not what one might typically think of as exciting, were the result of a board member's suggestion to my predecessor as president. They were an excellent idea and have made the task of administering the methods by which the CAC operates easier to convey and implement, clearer to understand, and readily accessible to our website visitors.

Our Seminar Planning Committee is constantly coming up with great ideas on how to simplify the process of hosting a semiannual seminar. The Awards Committee recently suggested the creation of a Best Poster Award to recognize the increase in both the quantity and quality of the posters we have been enjoying at our seminars. The Historical Committee came up with the idea of spending some money to properly organize and store the CAC's archive of documents, artifacts, and videos.

As an American, I should have remembered and been able to recognize sooner that true progress results from the synergy produced when a group of people are all working for the common good. That, of course, is precisely why the committee structure has been utilized by many governments and organizations for hundreds of years. The underlying strength of any leader is the people whom he or she is surrounded by and to whom he or she is willing to listen. The backbone of the CAC is the fantastic dedication displayed year after year by our members who volunteer their time to serve on committees and on the Board of Directors.

How relieved I was when I concluded that, as president, I don't need to come up with great ideas! The great ideas are already out there in the brilliant brains of our members and, as I have discovered, our non-members as well. I need only ask a few thoughtful questions, solicit advice from those around me, and be open to those good ideas when they fall in my lap. It is clear to me now that I actually am just a steward of the office of president of the CAC. But that definitely does not mean that we cannot accomplish great things together.



### MCMC For Dummies?

If you are one of those "DNA people" and have heard whisperings about something called "Markov Chain, Monte Carlo" (or "MCMC" for those who like to be efficient), but you have no idea what it is... There's an app for that! Download the free "MCMC Robot" app from Apple's App Store and you can get the basics of this method of statistical sampling much faster than trudging through articles replete with complex statistical formulae. Or, if you go in for that sort of thing, the app makes a helpful companion to said articles. Several computer-based DNA mixture deconvolution programs use this sampling method as part of their software, so it may be helpful to keep this app (literally) in your back pocket.

*Submitted by Eric Halsing*

### CACBit Quiz

I would guess that few readers of the *CACNews* are old enough to remember the small magazine, *Ford Times*. As a boy I looked forward to each issue because of a feature on the last page. Shown was a black and white photomicrograph of some small common item. The readers were challenged to figure out what the item was. Even though it was a common item, it was something that you were unlikely to have examined in detail under magnification. Perhaps that was the beginning of my love for trace evidence!



In the spirit of that old *Ford Times* feature, you are challenged to identify the item depicted above. You will find the answer on a page in this issue, as well as an additional challenge.

Here's my entry (I doubt it will work but I don't have an optical microscope to try it out on): Block the large hole in the center with something opaque and then use it as a mask generator projected on to the back focal aperture of an optical microscope's condenser lens. If the setup was done by a competent microscopist (not me), would you end up with a useful method of contrast enhancement? What if you blocked all but the outermost ring of holes?

*Submitted by Bob Blackledge*

*more CACBits on page 25*



## Stephen A. Shaffer

1952—2013

Long-time CAC member Steve Shaffer passed away July 23, 2013, following a battle with cancer. He is survived by his wife, Jana.

Steve was a graduate of the U. C. Berkeley criminalistics program and put his degree to good use in his various forensically-related careers. He founded Forensic Analytical Specialties as well as Microdataware, a software company which produced the Particle Atlas on CD-ROM. This collection of volumes is a favorite among microscopists and trace examiners.

Via his blog, Steve reported that in 2010 he had been diagnosed with stage IV oropharyngeal squamous cell cancer. Following chemotherapy and radiation he was pronounced "cancer-free." During that time and in the following three years, Steve found his passion for forensic science reinvig-



rated. After a hiatus of 23 years, he enrolled in the UC Davis master's program and at the time of his death was actively working on his research.

Steve was an active member of the CAC during the 1980's and 1990's, authoring or co-authoring numerous papers including, Fall 1979, "Observations on the Refractive Index at the Surface of Float Glass"; Nov 1980, "Principal Mineral Constituents of San Joaquin Valley Floor Soils"; Dec 1980, "San Joaquin Valley Soil Materials I"; "Example of a Covert Tagging System"(with Al Boudreau); Spring 1982, "Whither Trace?" An Examination of the Current Practice & Future Potential of Trace Evidence Examination" (Moderator); Spring 1985, "Draft Guidelines for the Establishment of Quality Assurance Programs in the Forensic Examination of Human Hair -Interim Report of the Subcommittee On Quality Assurance of the Committee of Forensic Hair Comparison"; Fall 1989, Forensic Hair Examination: A Tutorial Review (with James Bailey); Fall 1991, "Concepts of Electronic Information Management: Further Impact on the Microscopist"; Spring 1995, "Forensic

Science Sites on the Information Superhighway- Where to go and How to Get There on the Internet" (with Peter D. Barnett); Spring 1998, "Digital Photographs - How to Provide Them and How to Use Them for Discovery"(with Peter D. Barnett).

Most recently, Steve presented a paper at the Fall 2011 meeting entitled, "Fast Fourier Transform (FFT) as a Means of Isolating Prominent Stria."

Steve served as the CAC's recording secretary from 1984-86, taking over from Luke Haag. In 1985, he petitioned the board to institute a "Founder's Lecture" and the association continues to feature this event at seminars. Keith Inman suggests that "...they re-name the talk in his honor."

The Northern Section Trace Evidence Study Group owes its existence to Steve who also served for many years on the Training and Resources Committee. He was also a lively contributor to Pete Barnett's column "Ethical Dilemmas," which ran regularly in the *CACNews*.

Pete writes, "I recall having lunch with Steve and some of his fellow students, who were all about 30 years younger than Steve, at a CAC meeting a couple of years ago. It was clear from their comments at lunch that he considered Steve a valuable mentor. His experience and willingness to share with them was appreciated. At the same time, he considered them, and treated them, as equals and valued their opinions."

As Wayne Moorehead recalls, "Steve was a graduate student in the criminalistics program at UC Berkeley when I met him. He was as inspirational and cheerful then as he was the last time we spoke. Over the years, Steve and I taught several courses together at CCI and UC Davis, where he challenged students to think, which some found disagreeable, but for me, he was motivating.

"In the last class we taught together, when a student emailed him a question, he spent a lot of time writing to provide a complete answer the student. He wanted to give the student all of the information needed to understand the subject.

"In addition to being one of the two people to start the Forensic Analytical company, he was one of the scientists involved at the national level in establishing guidelines for asbestos analysis, he was at least a decade ahead of his time developing for the McCrone Research Institute the Particle Atlas Electronic Edition on CD (PAE2) which contained a multi-dimensional search function, a completely indexed text, and the ability to view images and data together. Those features are taken for granted today, but were mostly wished-for features then. He created an accurate-color Michel-Levy chart for the computer screen.

"Steve was an excellent microscopist and had begun a soil survey of the California Central Valley in order to build a database to source soil for cases. Unfortunately for criminalistics in California, Steve took a different path for about two decades. I was glad to hear that Steve was rejoining the criminalistics community a few years ago and am now deeply saddened to find he has permanently left us."

—Sources for this article included [stephenashaffer.net](http://stephenashaffer.net) and [myspace.com](http://myspace.com)

# The Editor's Desk

## Camaraderie

The annual fourth-quarter issue of the *CACNews* can be one of the more difficult ones to fill. There is no seminar with pictures and abstracts to fill the pages and as the deadline approaches most people are thinking more about enjoying their summer than sitting down at their computer finalizing a technical paper for publication. Luckily we have a consistent and talented group of people who provide you with their thoughts and musings every quarter. But those offerings alone can't fill all the pages of our newsletter. To fill the newsletter with content you find both informative and entertaining, our hard working, talented and creative Art Director, John Houde, is constantly on the look out for quality content. And, more importantly, he lights a fire under me to use my own creativity to help fill the pages. I feel we have been successful in filling this issue with a broad range of information guaranteed to have something for everyone.

When I received an email from John reminding me this issue might be a little light, I reviewed several past issues to see what they included to try and stimulate some ideas as to what we should include in this issue. A newsletter from a professional organization must do more than educate people on technical aspects of the field. It should share information about what is going on with the association itself and should also highlight its members and the things they do both professionally and personally.

I have spent a lot of words in my editorials sharing my views on professionalism, ethics, being an advocate for the evidence and generally reinforcing the importance of what we all do for the criminal justice system. In this issue I decided to devote some of its space to camaraderie. Criminalistics is an important profession that should be taken seriously and for which people should be devoted to doing the best job they can do. It shouldn't be just a job, but it also should not be your life. Nobody can do their best if they don't have a life which balances their job with family friends and other fulfilling endeavors. To help fill the pages of this issue I reached out to several people to share their experiences with participating

in activities that are not related to their job, but do result in positive interaction with co-workers and professional peers.

A couple of years ago, the LAPD and LASD crime laboratories joined together to form the first interagency Baker to Vegas Challenge Cup Relay Race team. My involvement as a supporter of the team impressed in me of the importance of getting together with your peers and doing something not related to work. In the pages of this issue you can read about three different Baker to Vegas (B2V) teams with forensic science participants. In each, you will read about the race itself, see some pictures of their activities and hear why they too feel the camaraderie of the activity is important.

**When you work (and play) together to make something like the B2V race a success you learn to work together better on the job and this improves our service to the profession.**



**Greg Matheson**  
CAC Editorial Secretary



The LAPD/LASD Crime Lab team ran its first race in April of 2012 after my retirement, but the preparation started many, many months before when I was lab director. I supported the team effort by approving fund-raising events and ensuring that though it wasn't an official work time activity there weren't obstacles placed in the way of a successful effort. Watching the team come together and witnessing the positive interactions within our laboratory and with the LASD laboratory confirmed this type of activity is very important when fostering camaraderie. I feel our laboratory has tried to bring its staff together in non work related activities and I have always been impressed with how involved and committed Dean Gialamas, the director of the LASD crime lab, is to involve their staff in activities that help bring the laboratory together. For the last two years, Dean has run the first leg of the B2V for our team (*photo*).

A strong support group is needed to make a B2V team possible. Many people work together for the year leading up to the race and in Las Vegas on the days of the race. From what I observed, nobody is a star and nobody is a flunky. Everyone pulled together to make the team the best it could be. When you work (and play) together to make something like the B2V race a success you learn to work together better on the job and this improves our service to the profession.

Another soapbox of mine deals with how we interact with each other on a daily basis. On occasion, I have been very disappointed by educated and talented people who feel they are better than someone else because they do more casework, outrank the person or make more money. Too often, the feelings they have are expressed in demeaning talk; body language or other actions that let the people around them know how they feel. This kind of activity unnecessarily negatively impacts the work place. A person might be smarter, richer, more educated, or professionally superior, but that doesn't make them a better person. Everyone is deserving of personal respect.

A book I recently received triggered the previous set of thoughts. For my retirement, Doreen Hudson, the new director of the LAPD crime laboratory and a very thoughtful individual, started a journal style book for me. She solicited lab personal, coworkers, staff from the LAPD, friends and other acquaintances to fill the book with kind comments, pictures and other memorabilia from my career. After working on this book for over 18 months, she presented it to me a few weeks back. It was very touching and I will treasure it. In the book there were two messages to me from clerical staff at the crime lab. They both commented on how much they appreciated my cheerful good mornings at the beginning of the day and my good evenings and have a good night at the close of the day. I was taken aback by how such a simple thing is what impressed them and helped make their workdays better. You never know how the simplest of things can affect those who work around you and how easy it is to make a positive impact on others in your life.

As evidenced by previous comments in editorials, I can be a bit of a snob about our profession and the work we do. I feel it is very important. But, in keeping with the above paragraphs, it is too easy to allow this strong feeling and commitment for ones own profession to negatively impact our interactions with other professionals. Unfortunately, early in my career, I fell into a belief held by many that because we are criminalists, have science degrees and do scientific work,

we are somehow better than our coworkers who do ID type of work like fingerprints and photography. By extension, that other professional organization the International Association for Identification (IAI) wasn't as "good" as our beloved CAC. As I said, that opinion was early in my career. I quickly learned how wrong I was and grew to respect the work of latent print professionals, photographers and other "technical" members of our profession. Our president-elect, Greg Laskowski, is a long time member of the IAI. At my request he prepared an article about the IAI and their recent annual meeting to help expand our membership's understanding of another professional and very important organization.

I mentioned I reached out to members for non-work related activities they share with coworkers to get the B2V stories. I would love to fill future issues with more of these types of stories. I am sure there are many and would encourage you to share your stories for future issues of the CACNews.

I hope you enjoy this issue of the CACNews.

*Greg*

### **P. S., Never Too Young**

Recently when my wife and I went to our daughter and son-in-law's house, I was thrilled to see our grandson, Leonardo (Leo) David Moreno, wearing his CAC shirt.




# BAKER TO VEGAS 2013 CHALLENGE CUP

Photos by LAPD/LASD B2V Team

What began in 1985 with only 19 teams has grown into a 24-hour, 120-mile, baton passing relay race broken into 20 legs of varying lengths and difficulties now known as the Baker to Vegas Challenge Cup Relay race. Today, over 280 teams start 25 miles north of Baker, CA (gateway to







Death Valley) to begin their trek across the state line into Pahrump, NV, then southeast to the finish inside the Las Vegas Hotel Convention Center. Runners may experience temperatures in excess of 120-degrees during the day to sub-freezing at night as they represent their team. It is truly an extreme challenge that requires not only physical conditioning, but mental fortitude to withstand such conditions.

Civilian and sworn personnel from the Los Angeles Police Department and Los Angeles Sheriff's Department make up the 20 runners and numerous support staff of the Los Angeles Regional Crime Lab team. We are the first joint agency team in the history of the race and are proud to represent the LA regional crime lab.

The Baker to Vegas Relay is the largest law enforcement event of its kind in the world, with teams participating from Canada, Germany, Australia, UK, and law enforcement teams throughout the United States. It really is both a National and International event.

Baker to Vegas is also one of the most positive events offered to law enforcement individuals today. The original ideals of the race continue to be: teamwork, camaraderie, physical fitness and competition. Over the 20+ years the relay has been run, hundreds of thousands of law enforcement personnel have tread across the desert unified in the goal of representing their agency as a team.

The LA Regional Crime lab team has participated in the race the last two years placing 249th place in 2012 with and overall time of in 21 hours and 11 minutes moving up 20 places. We finished the 120 mile trek through the desert in 2013 in 19 hours 52 minutes and 36 seconds and overall we were in 223rd place out of ~280 law enforcement teams moving us up 26 places and finishing 50th in our division.

Finally, Baker to Vegas is not only a personal challenge for each runner, but also a team challenge. As the first dual agency team, The Los Angeles Regional Crime Lab's combination of PD and Sheriff team members participation in this challenge race is a truly a testament to the resilience, teamwork, and competitive nature of our criminalists. Although our team improves every year, sometimes it's not about winning, but just about coming together, competing and enjoying the moment with your staff and friends; in an achievement that fosters camaraderie and a positive joint

challenge as well physical fitness. To be able to bond with your veteran criminalists as well as your Command staff from both LAPD and LASD is truly a unique experience. The wisdom that these individuals provide to the team instills a unique sense of pride for these men and women who have chosen this profession as civilians in a law enforcement agency.

—Katherine Scriven, LAPD

The OC Crime Lab is one of the only "all forensics" teams that participates in the Baker to Vegas Challenge Cup Relay. The team was started in 2009, and is open to anyone who works in the Forensic Science department of the Orange County Sheriff's Department. Originally started as a way for people from different lab sections to get to know each other and maybe get in shape, our team has scientists from all sections, specialists, clerical staff, and also some members of upper management. Our team of runners and volunteers work together throughout the year holding fundraisers to raise money for the race entry fee and to offset the cost of the race weekend. Organizing and working these events brings different members of the division together for a common purpose, and helps build a sense of camaraderie and teamwork. Several team members even volunteered at the OC Marathon this year. We also organize weekend training runs at various trails in the county; this helps us see each other in a different setting. We have a wide range of athletes on our team, from the absolute beginners to the seasoned marathon runners. The ages of our members also varies from the newbies in their early twenties to the lab veterans who have been around for a few decades! Though we are not an overall competitive team, the OC Crime Lab Running Team strive to improve every year in the Baker to Vegas Challenge Cup Relay, but most of all our goal is to have fun and represent the forensic community in this law enforcement-organized event.

—Juli Buckenberger, Orange Co. Sheriff-Cor.

In 2009, through the efforts of Investigator Anthony Lopez and Captain John Kades, twenty pioneer Coroner personnel ventured out to Las Vegas to compete in the law enforcement Challenge Cup Relay. Also known as Baker to Vegas, the event is a 120 mile relay with 270 teams and 10000+ runners and

support staff. You need at least 20 runners for the 20 stages with alternate runners as backup. Our department is 202 large – at least 10% of the department needed to participate and even more if you add in the support staff! In 2012, the thermostat reached 130 deg. F on the pavement and alternate runners were utilized on many of the teams racing. The extreme heat of the desert is just one aspect of this challenging race. In terms of logistics, there always needs to be a crew following the runner at all times along with a support crew to transport the crews around. You also need a "war room" constantly staffed to coordinate all the runners and supporting crews to get to their stages with all the proper equipment. Planning the logistics of the

**Organizing and working these events brings different members of the division together for a common purpose, and helps build a sense of camaraderie and teamwork.**

race, fundraising, and coordinating trial runs leading up to the race involve all members of the team.

Much work and stress comes from trying to get the team simply to race day, but the benefits have been great. Relationships between the different sections within the department have improved as we are one team racing towards the finish line together. At work we have a group that meet up after work every Wednesday to run around the neighborhood. I can say I'm healthier with B2V because I exercise, trying to stay fit for the next race. And of course, there are the memories of the race that we take back with us. Our first year, we had just 20 runners, which meant if anyone was injured, we would've simply forfeited. That year we were dead man running, we limped in with 3 minutes before the race officially closed. As difficult as the road has been, 2013 was our 5th consecutive year of running, our team has grown in size and in strength—and we're looking forward to 2014.

For more history and information regarding the race, please check out [www.bakerveregas.com](http://www.bakerveregas.com).

—Eucen Fu, LA Coroner

*cont'd*



When I first received the mass DOJ email regarding the Baker to Vegas race, I thought, how cool. This would be an excellent way to stay in shape and develop camaraderie. I was extremely eager to participate. But not eager enough because year after year, I let the event pass me by. It only took me ~14 years to finally commit to the team. I'm not a procrastinator at all am I?

The hardest part was deciding to commit. After I committed to the team, I knew my procrastination days were over. I had to stick to the training plan because this is a relay event. I can let myself down but I can't let my team down. The training plan, (thanks Samantha Skotarczyk) was to run one short run (4 miles) and one long run (9 miles) a week. The other 5 days were to be filled with 'other' activities. I stuck to this training plan with one exception. My long run was 6 miles, not 9. DOJ usually enters two teams, the Gold Team (serious, fast team) and the Blue team (slower, fun team). I was a member of the DOJ Blue Team. Remember, it's my first B2V race.

I had set some very lofty goals for myself for this race. My goals were: 1) to not be helicoptered out 2) to not be ambulated out and 3) to finish the race on my own two feet. Well, game, set, and match. There was no helicopter and no ambulance called for me. I even finished the race on my own two feet. The race kicked my butt, though. I'm embarrassed to admit this but I vomited a little near the last mile when I kicked it up a gear. But, I did my part and I'm glad I participated. I had fun, so much so that I THINK I'm going to do it again next year. © No, seriously, I am going to do it again next year. If anyone out there is thinking of doing it, don't think anymore. 'Just Do It!' Don't be like me and wait 14 years. My goals for next years race will be even loftier...to improve upon my time from last year and to not let the race kick my butt...

—Mey Tann, Regional Dir., South

## What Does the International Association for Identification (IAI) Have to do with Criminalistics?

By Gregory Laskowski

At the behest of our illustrious editor, I agreed to submit this article to report on the goings on at the recent IAI annual educational conference that I recently attended in Providence, Rhode Island. Before you stop here and turn the page looking for other, perhaps more informative articles in this quarter's edition of the CAC, I beseech you to continue to read further as it may result in free travel, lodging, and registration at the next annual IAI Training Conference to be held in Minneapolis, Minnesota. Free what? Did that grab your attention? You will have to read further for as they say, "The devil is in the details" or something to that effect.

First, let me get on with the preliminaries. What is the International Association for Identification? Well, to begin with it not just that other forensic organization nor is that group that consists of only fingerprint people and crime scene photographers. The International Association for Identification or IAI, which I shall henceforth be using that acronym so I don't have to type that title out repeatedly, is one of the oldest forensic science organizations in the country. It was established in 1915 and is soon to celebrate its 100th anniversary. Not bad for an organization hitting the century mark in terms of age.

In addition, it is one of seven forensic science organizations that make up the Consortium of Forensic Science Organizations or CFSO. The American Academy of Forensic Sciences, the America Society of Crime Lab Directors, ASCLD/LAB, the National Association of Medical Examiners, and the Society of Forensic Toxicology—American Board of Forensic Toxicologist make up the remaining member organizations. Over 7000 people representing 34 countries are members of the IAI. This is by no means a small organization. A point of fact that the inception of the IAI can be traced back to Harry Caldwell, a police inspector in charge of the Oakland PD's Bureau of Identification. So, you see there is a California connection.

While the IAI's primary focus is fingerprints, it has many specialties under its umbrella. Some of these include digital imaging, firearms and tool marks, footwear and tire track impression evidence, blood stain pattern analysis, crime scene investigation, and forensic podiatry. In fact, the IAI is the only organization to offer certifications in latent print examination, ten-print analysis, crime scene analysis, footwear evidence analysis, and blood stain pattern evidence analysis. Since many members of the CAC perform these sorts of analyses, particularly in the footwear/tire track analysis, bloodstain pattern analysis, and crime scene investigations, one might wonder why our membership is not more active in this organization.

But I digress, after all the title of this article is What Does the International Association for Identification Have to Do with Criminalistics? As the chair of the Subcommittee on Forensic Laboratory Analysis, my committee's purview is the remaining specialties which might fall under the umbrella of criminalistics. These include the specialties of trace evidence, arson and explosives, toxicology, controlled substance anal-

**Since many members of the CAC perform these sorts of analyses, particularly in the footwear/tire track analysis, bloodstain pattern analysis, and crime scene investigations, one might wonder why our membership is not more active in this organization.**

ysis, clandestine laboratory investigations, and DNA or as some prefer, forensic biology. That is a lot on the plate of one subcommittee. While we know there are a number of people that identify themselves as criminalists when they fill out an application to join the IAI, they don't seem to participate in the organization save for a few members. Thus, papers presented at the annual educational conference don't really reflect the range and levels of expertise that are truly part of the organization. So, over the past several years my subcommittee has been working actively to get more participation from those members that self-identify themselves as having an interest in "forensic laboratory analysis," but more on that later.

Some of the interesting topics that have come to light at the past few annual training conferences include a revamping of the IAI code of ethics, responding to the NAS report by developing various study groups to validate the scientific analysis employed in the identification of fingerprints, which can include both black box and white box studies, the attempt to bring interoperability and improve the accuracy of various automated fingerprint identification systems, studying the current and future processes of biometric analysis to include facial recognition programs, and such things as retinal scans and ear print identification.

However, the latest technology being pushed at the latest IAI annual training conference is rapid DNA data basing. Many of the same companies that are offering IAFIS technologies are now promoting themselves as the future in rapid DNA databasing. Hedging their bets that the current technology can be employed to perform automated DNA analysis under 2 hours, they feel that before DNA guidelines can be adjusted to meet these emerging technologies, these companies can create rapid or "r" DNA databases that can be used for preliminary investigative purposes. The thought here is that the DNA analyst would be taken out of the equation, yet a technical expert might be retained to ensure quality. The future would take much of the human element out of DNA analysis having expert systems check and verify the quality of the analysis. This is just a sampling of the many topics that are presented and discussed at an annual conference.

As I previously mentioned the IAI will be celebrating its 100 year anniversary at the annual training conference to be held in Sacramento, California in August of 2015. As a part of that celebration, a museum will be on site that will depict the hundred year history of the IAI. There will be displays of historical memorabilia associated with all the disciplines that are under the purview of the IAI. This is an excellent opportunity for the CAC to offer to provide examples of old equipment used in the laboratory to analyze physical evidence. Perhaps a search of the archives may reveal some documents or pho-

tographs that could be loaned and put on display. If anyone is interested in contributing to the forensic science museum or donating or loaning something for display, please contact Tamara Burkhart. She can be e-mailed by accessing the IAI website at [www.theiai.org](http://www.theiai.org) and clicking on the Centennial box, then clicking on the name, Tamara Burkhart

Now, I did not forget my promise to divulge to you the reader as to how one can get a paid trip to and from future IAI conferences, which will include lodging, and paid registration. Last year and the year before such an offer could only be made to IAI members specializing the fields associated with criminalistics.

This year the subcommittee, in accordance with the National Institute of Standards and Technology (NIST), is able to offer up to two stipends that will cover the costs of attending the conference except for meals and per diem through reimbursement to any bench working criminalist or student working in the traditional area of criminalistics excluding those specialties of firearms and tool mark analysis, blood stain pattern analysis, footwear and tire track analysis. Previous stipend recipients have given presentations on a wide range of topics such as trace evidence analysis from collection to analysis, drug trends in Palm Beach County including the appearance of spice and bath salts. This year our two candidates spoke on methylated DNA and the ability to distinguish sources of body fluids and the use of instrumental techniques to distinguish organic smokeless gun powders. So you see, it really isn't all about fingerprints and photography.

Oh, back to my offer—there is a catch though. The applicant must submit an abstract that must undergo a review by members of the Subcommittee on Forensic Laboratory Analysis. They must agree to make an oral presentation in the form of a lecture or offer to put on a workshop in the aforementioned specialties. To submit an abstract the applicant must send via e-mail by accessing the IAI website at [www.theiai.org](http://www.theiai.org) then clicking on the box marked Contacts/Committees, then scrolling down the list to Forensic Laboratory Analysis, then clicking on the e-mail box for me, Gregory Laskowski. I will then answer your e-mail so that you can reply to me and attach your abstract. It's that simple. Abstracts should be submitted no later than December 31st, 2013.

Please allow the subcommittee at least two weeks to review the submitted abstracts. Once the winners are selected, they will be notified by e-mail on who to contact at NIST to complete reimbursement forms and how to contact the educational conference coordinator so that your abstract can be accepted and added to the program. So far our subcommittee, through NIST, has offered a stipend to four people these past two years. The response from the awardees has been nothing but positive. So if you are interested in going to Minnesota next August, please submit an abstract. You have nothing to lose and everything to gain. Plus, you will get to interact with an international audience who share your passion and interests at least in the world of forensic science. I look forward to hearing from you.

One last thing, I promise. The Subcommittee on Forensic Laboratory Analysis is considering a name change. As subcommittee chair I have been given the choice as to what it will be and I am leaning towards calling it Criminalistics to reflect what the subcommittee is all about and to maintain some consistency with that other forensic science organization, the AAFS. You can let me know by giving me your input if this is something that should be done. Now, you can go ahead and turn the page.



# A Method to Reduce Analytical Time for a Wide Range of Controlled Substances When the Initial Method is Negative

Jamie Miller<sup>1</sup>, Wayne Moorehead<sup>2</sup>, Sylors Chem<sup>3</sup>

## Abstract:

Drug analysis in a forensic laboratory for a wide range of drugs can be very time consuming. To decrease the amount of time spent on the routine drug identification in a GC-MS, temperature programs methods have been developed to shorten analytical time. We propose a single GC-MS temperature program method that covers an entire temperature range of drugs, reduces analytical time, as well as differentiating select drugs such as Ketamine/Caffeine and LSD/LAMPA.

## Introduction

From the National Forensic Laboratory Information System (NFLIS) 2008 report, the most recent available, crime laboratories from federal, state, and local jurisdictions had an estimated 1.2 million items purported to be drugs analyzed in a one year period (1). By some estimates, drug related cases represent 75% of the submitted cases to crime laboratories (2). Forensic scientists strive to find efficient accurate methods that lessen drug analysis time, promote backlog reduction, and decrease turnaround time.

In the crime laboratory, forensic scientists search for a wide range of drugs or chemicals not typically used as drugs (e.g., Spice, bath salts, etc.). These drugs are found in a list of substances that are legislatively controlled or scheduled, California Health and Safety Codes 11054-11058 which relate to medical use and addictive properties of the drugs (3).

After a non-botanical or non-liquid substance (e.g., powder, tablet, etc.) has been screened using color test(s) or another initial analytical method, a second sampling is made for a confirmatory test. Often the sample portion is diluted with an appropriate solvent (e.g., ethanol or methanol) and a confirmatory test using a gas chromatograph with a mass spectrometer detector (GC-MS) is performed (4). In order to reduce analytical time on the GC-MS for some of the routine drug analyses, methods have been developed for the temperature ranges of the respective drug category (Table 1). These select GC-MS methods permit similar substances to be separated from each other to allow the correct identification (e.g., lysergic acid diethylamide (LSD) from lysergic acid methylpropylamide (LAMPA) etc.) while minimizing instrument time. If the ultimate outcome of the analytical data confirms the identification of a controlled substance, a non-controlled drug (e.g., pseudoephedrine), or other relevant chemical (e.g., bath salts, etc.), no further analysis is required. The appropriate identification for the sample is reported according to laboratory policy.

However, if the initial analysis suggests no controlled substances detected, additional work is necessary. Previously, in order to accomplish this task, an alkaline extract (e.g., bicarbonate extract) with two (or occasionally three) additional GC-MS temperature program methods were needed to complete the range of temperatures to search for the potential drugs (4, 5). The initial analysis along with these additional analyses (including appropriate blanks/negative controls) could consume over an hour on a single sample. In order to save analytical time and based on the data developed, the methods chosen could potentially miss the lower temperature gamma-hydroxybutyrate (GHB or its analog gamma-Butyrolactone (GBL)) or some of the high temperature steroids or other drugs. A simpler, less time consuming, and more encompassing method was needed.

A single GC-MS temperature program method is proposed that covers the entire temperature range of drugs submitted to the drug analysis section. The new screening method requires less time than the previous combination of methods while allowing for differentiation of selected drugs (e.g., Ketamine/Caffeine (Figure 1 & Figure 2). Additionally, a mixture of select drug reference materials (drug standards) was made to evaluate the functioning of the gas chromatograph is proposed.

## Method

Four GC-MS were available for establishing and validating a new method; two newer Agilent (Santa Clara, CA) gas chromatographs each had a mass spectrometer detector (GC-MS 7890/5975C) and an automated liquid sampling injector (CS1 & CS2) and two older Hewlett-Packard (Palo Alto, CA) gas chromatographs each with a mass spectrometer detector (GC-MS 5890/5970) with an automated liquid sampling injector (CS3 & CS-Hybrid). The initial system used for evaluating a new method was CS2, an Agilent GC-MS.

The standard injection method on the Agilent GC-MS showed splitting of isopropylbenzylamine (IPBA) and methamphetamine (Meth) peaks early in chromatograms (Figure 3a). Using a pulsed injection eliminated the early splitting of the peaks (Figure 3b).

After testing pressure pulsed injections, split ratios (e.g., 1:4 and 1:9), and numerous oven temperature ramping methods (Table 2), one GC-MS method resulted. The method Unk12\_Pulsed became the unknown screen method that could separate the following selected series of drug reference materials in the least amount of time:

1. Gamma-butyrolactone (GBL)
2. Isopropylbenzylamine
3. Methamphetamine
4. Caffeine
5. Ketamine
6. Morphine
7. Testosterone Decanoate
8. Lysergic Acid Diethylamide (LSD)
9. Lysergic Acid Methylpropylamide (LAMPA)
10. Sildenafil

These drugs were chosen to bracket the temperature range of compounds submitted to the laboratory for analysis. They range from the low boiling compound GBL to the high boiling compound Sildenafil in elution order. With certain GC/MS methods used for unknowns, low boiling compounds like GHB and GBL eluted close to the beginning of the chromatogram potentially eluting with the solvent front (Figure

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<sup>3</sup> Forensic Intern (2009-2010)

4). High boiling compounds like testosterone decanoate and Sildenafil may not elute within a method's time resulting in eluting in another sample. Since GHB converts to GBL with heat in a GC injection port (6), choosing GBL would suffice as a standard for GHB. Compounds known to elute closely and that may be difficult to separate from each other using gas chromatography were also selected. These compounds included IPBA/Meth, caffeine/ketamine, and LSD/LAMPA. All standards were prepared in ethanol. The first seven compounds were combined into one sample called MegaMix 3 (MegaMix). Because of the light sensitivity of LSD and LAMPA, they were combined into a second sample while Sildenafil was a third sample.

### Agilent GC-MS Method

The column used in the Agilent GC-MS was a 12 meter long and 0.20 mm diameter DB-1ms (100% Dimethylpolysiloxane) with a film thickness of 0.33 micrometers. The GC parameters for the unknown screen temperature program (Unk\_Screen\_Pulsed\_Split1\_9) are summarized below and the ramping illustrated in Figure 5. The overall time for the method is 19 minutes. The split ratio is 1:9.

Injector Temperature:	280°C	
Injector Pressure Pulse:	55.3 psi for 0.1 min	
Oven Temp. Program		Hold
Initial Temperature	40°C	1 minute
Ramp 1	30°C/min — 280°C	3 minutes
Ramp 2	30°C/min	
Final Temperature	310°C	6 minutes
Flow rate:	0.8 ml/min	

### HP GC-MS Method

The HP GC-MS contain a 15 meter column with 0.20 mm diameter DB-1ms (100% Dimethylpolysiloxane) with a film thickness of 0.33 micrometers. The GC parameters for the unknown screen (Unksrn) temperature program for the HP GC-MS are summarized below and the ramping illustrated in Figure 6. The overall time for the method is 19 minutes.

Injector Temperature:	280°C	
Oven Temperature Program	Hold	
Initial Temperature	40°C	1.5 minutes
Ramp 1	20°C/min to 140°C	0 minutes
Ramp 2	30°C/min to 280,	3 minutes
Ramp 3	30°C/min	
Final Temperature	310°C/min	4 minutes
Flow rate:	Maintain 1.0 psi for 3.5 minutes then 0.85 ml/min to end	

In the final evaluation, all the MegaMix samples produced the expected result (Figure 7, 8, 9) as did the casework samples. The retention times of the components were comparable (Table 3). The similarity of the ratios of retention times for the closely eluting compounds can be seen in Table 4. Both the Agilent and HP systems had comparable separation and baseline resolution.

A series of thirty-five previously analyzed casework samples was selected to test the reproducibility and reliability of the "Unknown Screen" method. These samples were selected to be representative of controlled substances casework submissions (Table 5). Of the thirty-five samples re-analyzed on CS2, there were a total of thirty-eight compounds tested. Ten of the thirty-five casework samples were analyzed on the other three GC-MS systems with each producing the expected result.

To determine sensitivity, GBL concentrations by serial dilution were made and analyzed using the unknown screen method. For the Agilent systems the reliable minimum detection was approximately 0.01 mg/ml while the older HP systems had a reliable minimum detection at approximately 0.05 mg/ml (Table 6). The retention time for GBL in each sample did not shift remarkably. CS3 and CS-Hybrid (HP) were found to be less sensitive to GBL than CS1 or CS2 (Agilent).

After the evaluation of the systems described above, awareness arose that the isopropylbenzylamine was not the best standard to use with methamphetamine for separation and identification of methamphetamine in casework. The current Mega Mix standard with IPBA could not be used for the identification of methamphetamine based on retention time because the separation of phentermine and methamphetamine was not evaluated.

Three solutions of phentermine were prepared in ethanol – 0.2 mg/ml, 0.1mg/ml, and 0.05 mg/ml. These solutions were analyzed using the Unknown Screen method on each of the four GC/MS instruments. Based on the results, the 0.05 mg/ml phentermine in ethanol gave the best results.

Next, three solutions of the current Mega Mix standard were spiked with the aforementioned phentermine concentrations. These solutions were analyzed using the Unknown Screen method on each of the four GC/MS instruments. Phentermine and isopropylbenzylamine did not have baseline resolution for any of the concentrations. However, phentermine and methamphetamine are sufficiently resolved that the retention time of methamphetamine can be used to aid in its identification.

Based on the results from this study, phentermine replaced IPBA in the Mega Mix standard using the same five milligram amount. Methamphetamine can be distinguished from phentermine by retention time using the Unknown Screen temperature program. The retention time window for methamphetamine identification was determined to be  $\pm 0.05$  minutes of a standard run contemporaneously with the questioned sample.

Overall, the new "Unknown Screen" method is capable of identifying compounds from GBL to Sildenafil regardless of which instrument is used. Closely eluting compounds like phentermine and methamphetamine, caffeine and ketamine, and LSD and LAMPA can be separated from each other regardless of the age of the instrument. However, because of the difference in sensitivities to GBL, the Agilent 7890/5975C GC/MS may be more useful for low concentration samples.

### Acknowledgement

The authors would like to thank Jessica Monterossa, Forensic Intern (2012) for her valuable work on evaluating phentermine to replace isopropylbenzylamine in the MegaMix.

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Table 1. Drugs detected with commonly used GC-MS methods.

**COMMON DRUGS RUN ON COMMON METHODS**

DRUG	UNK SCREEN	METH	UNK12	UNK20	COCAINE	HEROIN	STERIODS	THC	PSILOCYN	LSD	GBL
Methamphetamine	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
Amphetamine	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
Phentermine	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes
MDMA	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Cocaine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Heroin	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Morphine	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Hydrocodone	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Testosterone	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
LSD	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No
Amobarbital	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No
PCP	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
Psilocyn	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
THC	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
GBL	Yes	Yes	Yes?	Yes?	No	No	No	No	No	No	Yes

Table 2. Various temperature programs used. Unk12\_Pulsed was method eventually chosen.

Time	Temperature of GC/MS Method										
	Unk12_Pulsed	Unknown_1	Unknown_2	Unknown_3	Unknown_4	Unknown_5	Unknown_6	Unknown_7	Unknown_8	Unknown_9	Unknown_10
0	40	50	50	50	50	50	50	40	40	40	40
1	40	50	50	50	50	50	50	40	40	40	40
2	70	80	50	80	80	50	50	65	65	40	40
3	100	110	80	110	110	80	80	90	90	65	65
4	130	140	110	140	140	110	110	115	115	90	90
5	160	170	140	170	170	140	140	140	140	115	115
6	190	200	170	200	200	170	170	165	165	140	140
7	220	230	200	230	230	200	200	190	190	165	165
8	250	260	230	260	260	230	230	215	215	190	190
9	280	290	260	290	280	260	260	240	240	215	215
10	310	310	290	300	280	280	290	265	265	240	240
11	310	310	310	300	280	280	300	280	290	265	265
12	310	310	310	300	280	280	300	280	300	290	280
13	310	310	310	300	280	280	300	280	300	300	280
14	310	310	310	300	280	280	300	280	300	300	280
15	310	310	310	300	280	280	300	280	300	300	280
16	310	310	310	300	280	280	300	280	300	300	280
17	310	310	310	300	280	280	300	280	300	300	280
18	310	310	310	300	280	280	300	280	300	300	280
19	310	310	310			280	300	280	300	300	280
20			310					280	300	300	280
21									300	300	280
22										300	



Table 3. MegaMix retention time comparison using Unk\_Screen

Retention Time Comparison Between Instruments					
Sample ID:	Component(s)	CS1	CS2	CS3	CS-Hybrid
Mega Mix 3	GBL	2.597	2.611	2.81	3.00
	Isopropylbenzylamine	4.284	4.288	5.32	5.46
	Methamphetamine	4.364	4.367	5.43	5.57
	Caffeine	6.993	6.991	8.80	8.97
	Ketamine	7.192	7.183	8.96	9.14
	Morphine	9.022	9.017	10.83	11.36
	Testosterone Decanoate	15.263	15.339	16.06	16.69
LSD/LAMPA	LSD	12.409	12.430	13.40	14.42
	LAMPA	12.662	12.695	13.64	14.63
Sildenafil	Sildenafil	17.602	17.808	17.70	18.48

Table 4. Differences in retention time between select closely eluting drugs

Comparison of Differences in Retention Time Between Closely Eluting Compounds				
Components	CS1	CS2	CS3	CS-Hybrid
IPBA:Meth	0.08	0.079	0.11	0.11
Caffeine:Ketamine	0.199	0.192	0.16	0.17
LSD:LAMPA	0.253	0.265	0.24	0.21

Table 5. Summary of Re-Analyzed Casework Samples by Compound

Compound Tested	No of Samples	Percentage%
Heroin	10	26.3%
3,4-Methylenedioxymethamphetamine (MDMA)	9	23.7%
Methamphetamine	4	10.5%
No Controlled Substances (NCS)	4	10.5%
Cocaine	3	7.9%
Oxycodone	2	5.2%
Psilocin	1	2.6%
Alprazolam	1	2.6%
Caffeine	1	2.6%
Lidocaine	1	2.6%

Table 6. GBL Sensitivity and Retention Time Comparison Between Instruments

Concentration	CS1	CS2 (old insert)	CS2 (new insert)	CS3	CS-Hybrid
0.10 mg/ml	2.583	2.608	2.611	2.78	2.97
0.05 mg/ml	2.578	2.608	2.607	2.760	2.94
0.025 mg/ml	2.580	2.606	2.606	Not detected	Not detected
0.020 mg/ml	2.579	2.611	2.606	Not detected	Not detected
0.015 mg/ml	2.585	2.627	2.617	Not detected	Not detected
0.01 mg/ml	2.585	2.637	2.632	Not detected	Not detected
0.005 mg/ml	Not detected	Not detected	Not detected	Not detected	Not detected
0.001 mg/ml	Not detected	Not detected	Not detected	Not detected	Not detected

Figure 1. Caffeine retention time with Meth method

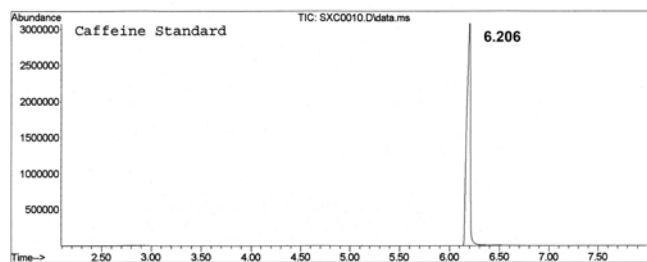
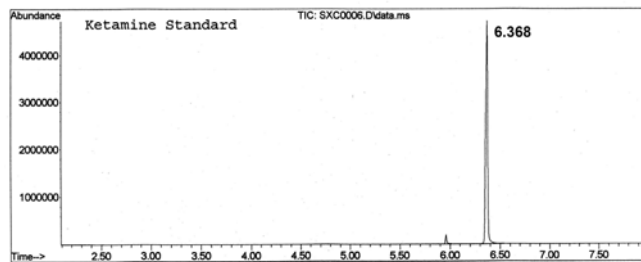


Figure 2. Ketamine retention time with Meth method



Figures 3a and 3b. Select chromatogram of IPBA and Meth a) when no pulsed injection used b) when pulsed injection used

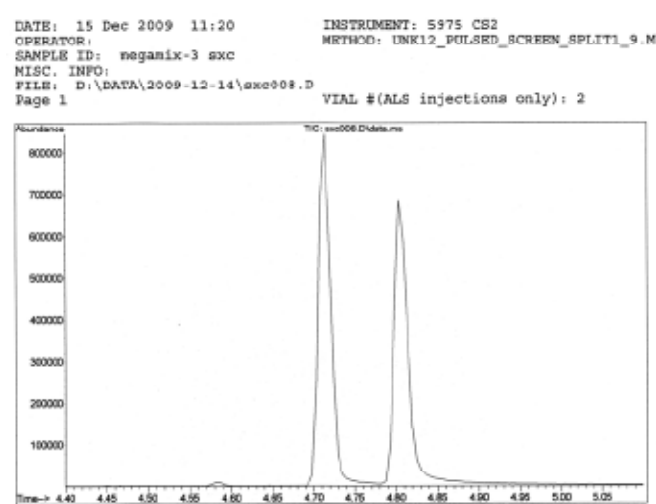
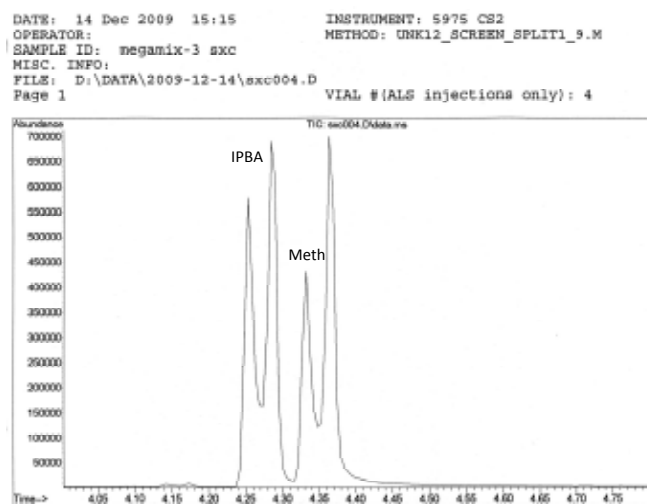


Figure 4. GBL standard in typical GC-MS temperature program for unknowns

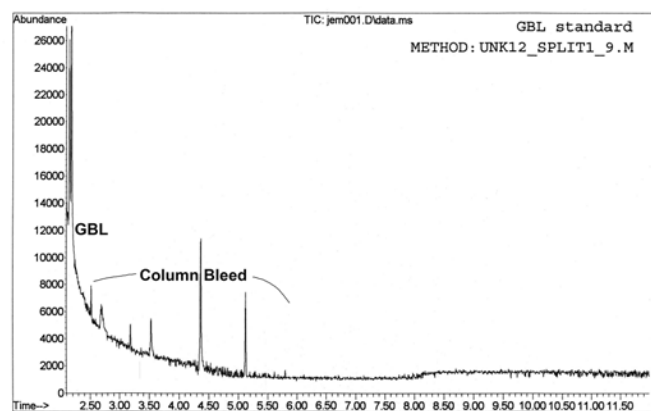


Figure 5. Temperature program of Unk\_Screen with Agilent GC-MS

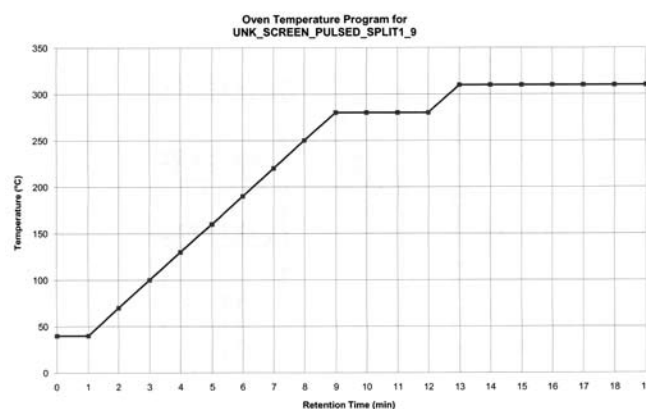


Figure 6. Temperature program of Unksrn with HP GC-MS

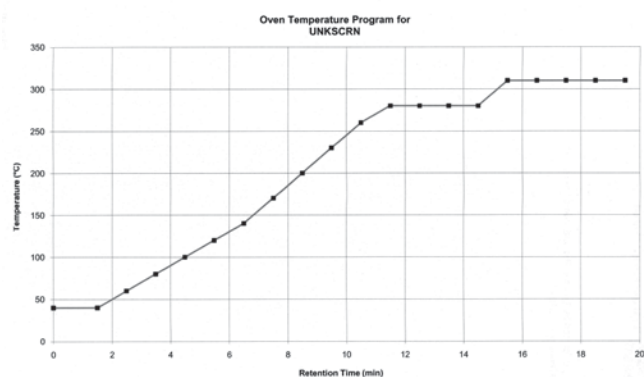


Figure 7. Chromatogram of MegaMix with IPBA with Unk\_Screen

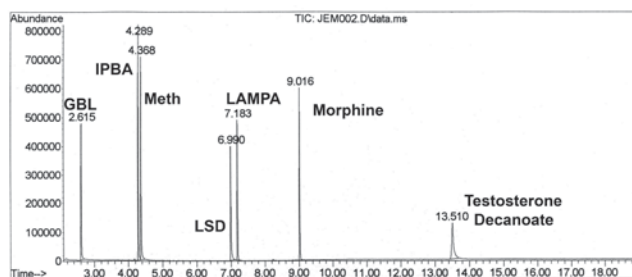


Figure 8. Chromatogram of LSD/LAMPA separation with Unk\_Screen

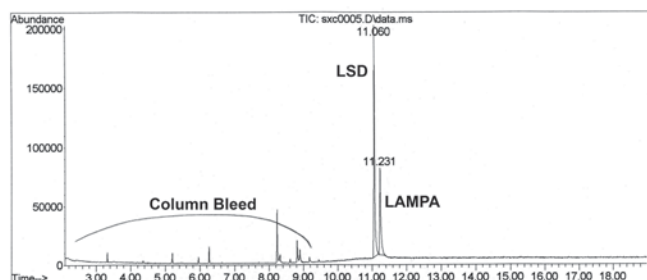
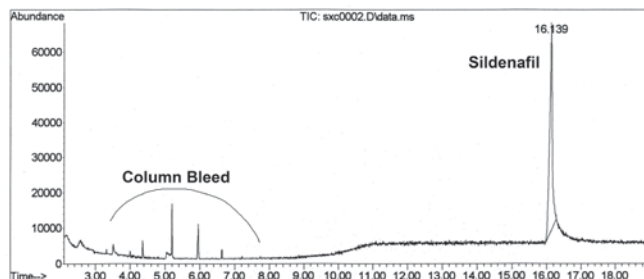


Figure 9. Chromatogram of Sildenafil with Unk\_Screen



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# Ethical Dilemmas

DISCUSSION CORNER WITH CAROLYN GANNETT

## Dealing with the Unethical Conduct of a Co-Worker: An Anonymous Reporting System

### THE SCENARIO:

Susie and Bobby are both analysts in the same crime lab. Susie thinks Bobby may be doing something unethical. She wants to see it addressed, because she knows that if she does nothing, then she becomes part of the problem. She also knows that others in her lab have suffered recriminations and retaliation for reporting possible ethical transgressions.

How does Susie decide how to proceed?

### K.I.S.S.

Wouldn't it be great if there were one simple answer to every employee who wanted to know how to respond to observed possible ethical transgressions? What if that answer were, "Report it through the lab's anonymous ethics hotline?" This is reminiscent of the anonymous safety hotline that some agencies have. See a safety problem? Report it with impunity, without fear of recriminations or retaliation: a system is in place to receive anonymous reports and funnel them to those responsible for rectifying them. Such a system encourages the reporting of problems. That is the first step in resolving any matter—identifying the problem. An ethical problem cannot be addressed if it does not first become known to those responsible for rectifying it.

As far as I know, no crime lab has a system in place for the anonymous reporting of possible ethical violations. I think development of such a system is worth looking into.

The vast majority of forensic scientists (perhaps nearing 100%, based on a highly informal survey of over 400 forensic science ethics students) believe that we are responsible for policing each other. That is, each individual forensic scientist is

*As far as I know, no crime lab has a system in place for the anonymous reporting of possible ethical violations. I think development of such a system is worth looking into.*

responsible for, in some manner, addressing any potentially unethical conduct encountered in the profession, even if that means simply reporting it to the proper authority. This concept is explicitly written into the *ASCLD/LAB Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientists*, paragraph 5:

*Report to the appropriate legal or administrative authorities unethical, illegal, or scientifically questionable conduct of other laboratory employees or managers.*

Requirements for reporting unethical conduct, based on various ethics documents, was examined in detail in a previous installment of this series (see *CACNews* 2nd Q, 2011).

Crime labs are not perfect. Reporting problems to management can, and sometimes has, resulted in negative outcomes for the reporters. This can discourage future reporting of possible ethical transgressions, ultimately undermining the ethical practice of forensic science within that lab, and tarnishing the reputation of forensic science in general.

An anonymous reporting system would remove the fear-of-recriminations-and-retaliation factor. It would serve as a demonstration to the public that the lab takes the pursuit of ethical practice seriously.

Sometimes complaints of ethical transgressions to supervisors or managers can fall on deaf ears, again, undermining ethical practice. An anonymous reporting system could be designed to have a built-in system for alerting the entire chain of command within the lab (perhaps beyond). That would make it difficult for a complaint to be ignored.

Designing and implementing an anonymous reporting system is beyond the scope of this article. But, consider the sheer volume of what follows under "DON'T K.I.S.S." It lists just a smattering of factors that Susie may have to consider in the absence of an anonymous reporting system. How she responds to some could affect her career, or even end it. It has happened. A forensic scientist decides to do the ethical thing and report a matter, and winds up hurting or losing his or her job.

No individual forensic scientist should have to carry this burden. It should be relieved, and an anonymous reporting system may be a means of achieving this.

### DON'T K.I.S.S.

Here are just some of the factors that Susie, or anyone faced with a potentially unethical coworker, might have to consider if anonymous reporting is not an option.

Does Susie have the facts straight? Susie does not want to make inaccurate accusations. To what extent can or should she investigate? It is not her responsibility to do so, but she also does not want to stir the pot if there really is no problem.

Should she first go to Bobby and ask him his side of the story? Maybe. She might have misunderstood his actions. She might have misunderstood what constitutes unethical conduct. Perhaps Bobby could set her straight on both counts, they could agree there's no problem, and the supervisor need not be involved. All could be resolved with minimal disruption to the workplace.

Or, maybe she should *not* go to Bobby first. There are several things to consider. Is Bobby's conduct a serious or repeated transgression? If so, perhaps it is too important to address one-on-one with him. Perhaps Susie should report directly to

the supervisor and let that person determine whether Susie had her facts straight. Is there a potential that going to Bobby first would give him the opportunity to destroy evidence of his transgression before the supervisor gets involved? If so, going directly to the supervisor might be best. Is there pre-existing animosity between Bobby and Susie? If so, any attempt to resolve the ethical matter without involving the supervisor could make the ethical and the interpersonal situations worse. Are Bobby and Susie great pals? If so, not involving the supervisor straight-away could result in accusations of collusion in an attempt to hide Bobby's mistake from others.

How much information must Susie have before deciding that there may be an ethical transgression?

If Bobby appears to have committed a serious or repeated transgression, perhaps very little indication of that transgression is needed to justify making a report directly to the supervisor. But, how is the line drawn and a balance determined between seriousness of a transgression and the available evidence of its possible commission? If a possible transgression is quite mild, does that mean it needs stronger indication of having actually occurred before Susie needs to act? How are these determinations made? And, how does the individual forensic scientist know what they are?

How well will Susie's concerns be received by the supervisor? Supervisors, ideally, should be open to receiving and taking seriously all reports of possible ethical transgressions. But, we all know that supervisors are human and none are ideal. Susie would need to consider how receptive the supervisor would be to her concerns, the supervisor's track record of pursuing matters vs. sweeping them under the rug, whether the supervisor would treat Bobby or Suzie unfairly (either towards or against), and whether the supervisor has a record of recriminations or retaliations. Perhaps, after considering such factors, Susie would decide that it is wisest for her to go over the supervisor's head, or to another supervisor. And, the same factors would then need to be considered all over again regarding those people.

Must the supervisor even be involved? Consider a situation in which Bobby's transgression is a very minor matter with no known repercussions, Susie understands that Bobby has never before made this error, her relationship with Bobby is strictly professional, and she is convinced that he now understands what he did wrong and will not do it again. The supervisor is unfair, has a history of retaliation, sweeps problems under the rug, and smells bad, to boot. Why complicate matters—why bother the supervisor and submit your olfactory senses to insult?

Here are some reasons in support of reporting to the supervisor, regardless. Susie does not really know that this is the only time that Bobby has made this mistake. It is not her responsibility to know this. It is, however, the supervisor's responsibility. And, the supervisor relies on others to stay fully informed regarding happenings in the section. If the supervisor is not told, and this is an ongoing problem with Bobby, the problem may not be adequately resolved. Even if it is not an ongoing problem, it could become one. The supervisor needs to know of the first transgression.

What is the best way to inform the supervisor? Susie and Bobby could agree to go together to the supervisor. Bobby might insist on going alone. Now Susie may have to follow up with the supervisor to ensure that Bobby really did go. Bobby may refuse to go (he can't stand the smell). Susie might decide

to go alone. But, Bobby's side of the story might be needed, or Susie might be at risk for suffering recriminations from co-workers for being a "tattle-tale." Should the supervisor be informed verbally? In writing? Both? Who else should be notified?

Any verbal exchange with the supervisor might best be followed up with an e-mail from Susie to the supervisor and Bobby, describing the discussion. This provides documentation of the matter. It also gives the other parties the opportunity to document in an emailed reply any difference in opinion they have regarding what transpired. Consider the adage that if it is not in writing, it did not occur. Even a small matter could blow up in the future. It could be prudent to document even what seems to be the smallest potential ethical transgression.

Et cetera, et cetera, et cetera.

## SUMMARY

I could go on and on: more reasons not to involve a supervisor; factors to consider when deciding whether to report the matter to someone outside the lab, outside the agency, to legal authorities, or to professional associations; how to report to an association; when might Susie need Union or legal representation; and so on.

The point is, all of these considerations are a tremendous burden for one little forensic scientist to take on. Shouldering this load alone is not conducive to ferreting out unethical conduct. If anything, it can quash it, and even scare some people completely out of the profession.

An anonymous reporting system removes, or at least significantly lessens this burden. It encourages the reporting of possible ethical transgressions and bolsters an ethical working environment. The system can be designed to alert all in the crime lab's chain of command, and perhaps others, that a problem exists, which encourages a resolution to the problem. Such a system would help to ensure the public that the crime lab takes seriously all potential ethical transgressions.

Seems like a good idea on paper. Any labs out there willing to give it a go?

*Share your thoughts & dilemmas at  
[www.ethicsforum.cacnews.org](http://www.ethicsforum.cacnews.org)*



## What Science Could (and Should) do for Justice

Physical meals together this summer have been few and far between. Both of us spent much of the season in different states, far from California and from each other. During one trip we were actually in the same place (Denver) and had some fabulous meals (*Rioja* is highly recommended) at which all we wanted to do was check out after long days. So, in our never-ending search for good free conferencing software, our current favorite is *Uberconference*, which was the vehicle for the current *Proceedings*, conducted over a much-too-early pre-breakfast coffee.

To recapitulate where we left off from the last Proceedings, we had asked our readers to consider the question of to whom forensic scientists owe their allegiance. Is it to justice, or to science? This was precipitated by an address given to an audience by one of us (KPI) in another state on a variety of topics. The participants and speakers comprised both forensic science colleagues and representatives of the legal system. At the end of the session, Keith suggested the following:

If the police arrest the correct person 95–97% of the time, then one of the valuable functions that science and our crime labs can provide is to assist in identifying those 3–5% of the cases where the investigation has led to the wrong person being identified as the perpetrator.

Now, truth be told, what was expressed at the conference was not nearly as refined as what is written above, but the tenor of the comment stimulated significant pushback; most in the audience understood the sentiment, but were not willing to accept the concept as a role they wished to play.

One commenter, a district attorney, phrased his opposition this way:

*We all serve one master, and that is justice.*

We then suggested the following to our readers: forensic scientists, we submit, are actually claimed by two masters:

**justice and science.** Which one do we serve? The publishers of *Science and Justice*, at least, would seem to acknowledge, even embrace, this dual allegiance. But how do we cope with it in a practical fashion?

We went on to suggest that this is of everyday concern to all practitioners, inasmuch as we face a variety of conflicts between the needs and requirements of law and the practice of sound science. Before discussing some examples of this conflict, we would like to begin our current discourse by reciting from one of our favorite books, *Forensic Alchemy*, written by David Faigman in 1999. In it, Prof. Faigman attempts to outline the conflict between law and science. He posits that science and justice are, in fact, blood relations, but defines the critical question as whether law and science can live together happily. Among other things, and leaving out a significant portion of his argument, he believes that the division of law, science (and religion) has led to a competition among them for the hearts, minds and souls of society. We would note that competition is rarely friendly, and necessitates declaration of a winner.

To make this more personal, law and science vie not only for the hearts, minds and souls of society, but also for the hearts, minds and souls of forensic science practitioners as well. For if our attorney friend is correct, and all scientists serve justice, then, as our justice system is presently constituted, scientists are currently commanded to pledge allegiance to the flag of law. And if this is the case, then of course science is not competing for the hearts and souls of society on an equal footing with the law. We'd like to provide some examples of this competition.

We start with a common issue; a scientific technique might be well-established in science but not admissible in court, especially when the technique appears new to the law (which, in our experience, might mean something in existence in science for 15–20 years). A current example might be whole-



Those who lack the courage  
will always find a philosophy to justify it.  
—Albert Camus



genome sequencing. It is possible to sequence the entire genome of a single individual for a few thousand dollars. The technique is the subject of world-wide government and private funding and research, and its capabilities and limitations (in the form of errors made in sequencing, as well as steps to recognize and correct those errors) are well characterized. Put another way, decisions can be made based on the results with well-characterized uncertainty. In fact, the capabilities and limitations of this technique are far better defined than many existing forensic science methods currently accepted into courts of law on a daily basis with no questions asked. With this information as background, it is not impossible to construct a scenario where some extremely important person is assassinated, and whole genome sequencing of some biological material left at the scene could reveal the actual perpetrator, with, again, some fairly well-defined uncertainty. Would the courts allow testimony of such an analysis? If the DNA admissibility hearings in the US are any indication, no. It would take years of motions, briefs, hearings, arguments, and court rulings before the issue was finally settled. And yet a blue ribbon panel of recognized *science* experts could settle the matter in (we believe) a few short months given the proper resources (as in money) to produce a report. And that report would include appropriate wording to communicate the meaning of the results to identify the boundaries of the science involved.

Why this difference in speed and efficiency in decision-making? Faigman observes that the law has its own version of science that occasionally dictates descriptions of how the real world works—whether it works that way or not. In particular, the *law of science* often has very different starting assumptions than does science's version of science (pg. 26). And we think that most forensic science practitioners have experienced this alternate view of science imposed upon them by law.

Now, many legal scholars like to point out that science seeks truth, while law seeks justice, and by implication, this justifies the law constructing its own version of science. But this simplistic difference in goals tends to mask a perverse but essential similarity: both science and law seek to make the best decision possible given the information available. In fact, both science and law have established guidelines for avoiding factual errors that policy indicates are too costly.

For example, science uses statistical confidence to identify the risk of drawing a specific inference or making a decision about some proposition. The law, for its purposes, has created a “burden of proof” for assisting the trier of fact when deciding for the proponent in civil (preponderance of evidence) or criminal (beyond a reasonable doubt) matters. Faigman asserts, again perversely, that no true correspondence exists between these two means of expressing doubt.

So while the work of both science and the law share similar goals, their divergent starting points, the diverse problems they tackle, and the tools each has created to assist in the resolution of competing hypotheses result in inevitable tension and conflict when both find themselves working on the same problem (a crime, for example). And when the law is asked to arbitrate the admissibility of scientific evidence (as in

<sup>1</sup> For example, it would be interesting to require the deciding judge take a test at the end of her education (hearings) to determine whether she has learned enough about the science to make a decision. And if she hasn't, then either she isn't allowed to make the decision, or she must listen to more scientific testimony. Most, we suspect, would choose the agony of the dental chair to such a fate.

**We have written in the past on the oxymoron encapsulated by “scientific certainty,” and how no true scientist would use that phrase ... Yet in some jurisdictions forensic scientists are forced to use that (or some similar) phrase when describing their results or risk having their testimony disregarded. No clearer example of the conflict between law and science can be found; what should the scientist do when confronted with such a challenge to their allegiance?**

our hypothetical whole genome sequencing scenario), the result is a long drawn out dispute that entails partial education, partial understanding, long learning curves, and, in the end, no true understanding of the science or the uncertainty of the technique and its application to the current problem<sup>1</sup>.

This segues into another, similar, issue; that of communicating results. Both of us have bumped up hard against the “to a reasonable scientific certainty” phrase required in some jurisdictions. This incisive example of policy directed by legislation or case law profoundly illustrates Faigman's science-as-defined-by-law assertion made several paragraphs above. We have written in the past on the oxymoron encapsulated by “scientific certainty,” and how no true scientist would use that phrase because, among other things, a fallacy can not possibly be reasonable. Yet in some jurisdictions forensic scientists are forced to use that (or some similar) phrase when describing their results or risk having their testimony disregarded. No clearer example of the conflict between law and science can be found; what should the scientist do when confronted with such a challenge to their allegiance?

To complicate the situation, this is also where scientists must confront a rude reality; science is never practiced in a vacuum, and often contains as much policy as science. Statistical significance, for example, is typically set at 5% (and not infrequently at 1%), but that is done as much for the comfort of the researcher as any other consideration. Karl Popper observed,

*The history of science, like the history of all human ideas, is a history of irresponsible dreams, of obstinacy, and of error. But science is one of the few human activities – perhaps the only one – in which the errors are systematically criticized and fairly often, in time, corrected.*

In other words, scientists are human. We have no particular claim on “purity of the discipline,” no special claim to

the moral high ground, nor can we assert that we would never bow to policy pressures. Ultimately all decisions, at least in applied science, are driven by policy in addition to data. All one needs to do is read the front page headlines about climate change, breast or prostate cancer screening, or the computer algorithms dictating communications surveillance to run, head-on, into the translation of data into policy. The fact is, in the world of applied science, without policy, data has little meaning. So if a statute or case law requires a statement of “reasonable scientific certainty,” who are we to defy the dicta?

It is here that both the law and science have failed forensic science practitioners; no clear and universal policies, procedures, or guidelines exist to guide us through this dilemma (codes of ethics notwithstanding). Law refuses to talk about it (What problem? We’ll tell you what to say and how to say it. Use our view of the world when you’re in the courtroom), and scientists outside of forensic practice scoff at anyone foolish enough to wander before the bar. Both forensic science and forensic scientists have, generally, sought refuge at the bench, the unfounded hope being that good work will speak for itself. But if you do not speak for your work, the attorneys will be more than happy to do it for you; and their rendition may not be the one you want. However, no infrastructure exists to support scientists in the support of science.

**Ironically the best outcome  
for justice is when science  
perseveres in being  
science, and is welcomed  
as such by the law.**

In other words, the answer to our question, what do you do when your allegiance is challenged, is that you are on your own. The law insists that you follow its dictates and mandates; but our education and training in science tells us that there may (or should) be other options. In many cases, that requires enormous courage entailing significant consequences. Who among us is willing to say to a judge, a DA, or a defense attorney; this is the science, and this is the way science expresses itself? In ways both subtle and overt, each of us constantly avoids that confrontation, and finds a way to compromise.

In our previous column, we identified a few instances where the conflict between law and science exists, and where our allegiance may be called into question. Some we used in the examples above, while the remainder we repeat here:

The spirit of openness and transparency in academic science and the requirement for strict oversight of information flow in law.

Confidentiality constraints that impede the direct exchange of information both between scientists and from scientists to the arbiters of justice.

Balancing the need for detail and clarity (writing for your colleagues) with brevity and simplicity (writing for the legal consumer) in both written reports and testimony.

Requests (or more forceful measures) by attorneys to influence or alter testimony or reports, either by edits or omissions.

Norah insists that two ways exist in which justice can lose and only one way in which it can win. If justice attempts to impose its will on science, and science accedes, then justice loses. If science (e.g., through a courageous analyst) defies the law, and because of that the results of science are precluded from evidence, then justice also loses. Ironically the best outcome for justice is when science perseveres in being science, and is welcomed as such by the law.

Prof Faigman suggests that the intersection of law and science is a tactical problem: “allocating responsibility between legal experts and popular will in a way that maximizes the use of science but effectuates basic democratic and constitutional principles. It is specific but it is not simple.” (pg. 191).

One of us (KPI) was privileged to deliver a talk at the 2012 European Association of Forensic Sciences meeting in The Hague last summer. At the end of that talk, entitled “Forensic Science 2.0,” Keith asked the following questions:

How do we create a true discipline that creates its own standards, ethics, and insists on its own dogma?

How do we define our “why” in a way that allows us scientific autonomy yet serves the needs of justice?

First, we must understand the full import of “serving the needs of justice.” This does not necessarily include doing the bidding of those who request our agency, in the sense that they can dictate our actions or reporting (interpretation of results). We will give in to the attorney who admonished Keith to “serve justice” only if we can enter on our terms, not theirs.

We would like to extend Prof. Faigman’s injunction to allocate “responsibility...in a way that maximizes the use of science” with a specific recommendation. Acknowledging the unique nature of our position within the justice system, we now have the *gravitas* sufficient to request, or require, or perhaps insist, that science participates, if not as an equal partner, at least as an independent *collaborateur* in the administration of justice. We demand standing, with a voice that counts. Science can only serve the cause of justice if it is emancipated, independent, and autonomous.



# CAC Fall Seminar, Modesto Workshops

## DNA Workshop

Full-day workshop intended to satisfy the Federal Quality Assurance Continuing Education requirement. The presentations will include a variety of speakers and topics including: *Thomas Callaghan*—Rapid DNA developments that are evolving throughout the forensic arena and the future of the forensic DNA discipline. *Shawn Kacer*—An interesting court experience in a homicide trial that involved two trials, and an opposing DNA defense expert. *Mark Timken*—The Basics of Next Generation Sequencing and *Sonja Klein*—Stochastic Sampling in STR Analysis.

## Alcohol Correlation Study: To Drive or Not to Drive...0.05

Evaluate how an individual's alcohol consumption affects their behavior and ability to complete divided attention tasks. Discussion regarding the alcohol level at which all individuals are impaired, with some additional focus on 0.05 BAC vs. 0.08 BAC in light of recent recommendations by NTSB. Approximately 6 drinkers will be required to routinely complete a variety of divided attention tasks, including field sobriety tests. Participants will have an active role in conducting the tests and assessing drinkers' performance. The study will also correlate blood and breath alcohol levels. Results will be provided to all participants.

## Firearms: Subclass Characteristics

*Nancy D. McCombs*—Explore the historical development and evolution of "Subclass Characteristics" and look critically at the use and definition of the term. A wide variety of firearm and tool manufacturing processes will be evaluated for subclass potential. Methods of recognizing potential subclass characteristics on tooled surfaces will be examined. Lab practices, interpretation, and legal challenges will be discussed. Emphasis on recognizing or eliminating the potential of subclass involvement, strategies to ensure identifications are not subclass in nature, and discuss reporting methods if subclass influence is suspected.

## Introduction to Bloodstain Pattern Interpretation

*Craig Ogino*—Fundamental principles of bloodstain pattern recognition and interpretation. It will cover the physical properties of blood, types of bloodstain patterns, mathematics used, documentation, report writing and courtroom presentation. The instructor will discuss potential questions that can be expected at a 402 hearing regarding bloodstain pattern evidence and he will present multiple crime scenes.

## Drugs and the Human Body...

### Beyond the Toxicology Report

*Brandon Baldwin, Erasmo Carrizosa*—Focus on the physiological affects of various types of drugs on the human body. Both toxicologists and drug analysts should benefit from this workshop, which aims to bridge the gap between the toxicology report and the behaviors that officers encounter on the street. Discussion topics will include the Drug Recognition Evaluation (DRE) program, signs and symptoms of various drug classifications, and 'useable amounts.'

## Current and Emerging Drug Trends in California

*DEA Western Laboratory Staff*—Synthetic Cannabinoids, Substituted Cathinones, and Methamphetamine Trends.

An overview of the rise in popularity of synthetic cannabinoid products and substituted cathinone analogues as drugs of abuse in the United States. A brief history of the first appearances of these drugs; the variety of different analogues identified, to date, in case work; analytical challenges; and other aspects of this growing problem will be presented. The current trends in methamphetamine production will also be presented along with analytical information for reaction by-product markers.

## Legal Panel: Scientific Testimony from Attorneys' Perspectives

*Linda A. McFadden, Marlisa A. Ferreira, Ruben A. Villalobos and Linda Starr*— Gives participants an opportunity to have an open discussion with members of the criminal justice system regarding their expectations when introducing expert scientific testimony. The legal panel will consist of attorneys for the prosecution and defense, an attorney from the Northern California Innocence Project, and an experienced trial judge. Participants will have the opportunity to submit questions or topics for discussion, and a moderator will be present to keep the discussion moving and on-track. The primary goal of this workshop is for participants to get a lawyers' perspective of what makes a good witness, what jury's expect, and how to work with their expectations while maintaining our ethical responsibilities.

Visit [cacnews.org](http://cacnews.org) for the latest seminar information!



# “Trace DNA”—What Can It Tell Us?

Meghan Mannion Gray and Annette Kiewietdejonge  
Jan Bashinski DNA Laboratory

A small research experiment was undertaken to address some of the questions regarding trace DNA, specifically whether or not DNA analysis reveals the last person to touch an object. Controlled experiments were designed to simulate crime situations. Four types of objects were used for this experiment: pens, door handles, car steering wheels, and ligatures. These objects were chosen as being representative of potential evidence encountered in the following scenarios: bank robbery (writing a hold-up note); home invasion break-in; carjacking; and kidnapping.

## Pens

Two types of pens were used, one smooth plastic pen and one with a soft grip. New pens were cleaned with bleach and water prior to the experiment. The pens were left at the reception desk of our lab for general use for one week. At the end of the week a volunteer was asked to write out a specific note, once with the smooth pen and once with the soft grip pen. Each pen was then swabbed. This experiment was done with seven sets of pens and seven volunteers. The volunteers were asked to wash their hands ~1 hour before writing the note.

## Door Handles

Three commonly used doors in our laboratory were chosen for this experiment. The door handles on both sides of the doors were cleaned with bleach and water at the beginning of the experiment. After one week of regular use (following the cleaning) a volunteer was asked to enter one door by pushing on the door handle, then exit through the same door by pulling on the door handle. Each pushed door handle and each pulled door handle was swabbed. A total of six volunteers were used for a total of six “pushed” swabs and six “pulled” swabs. The volunteers were asked to wash their hands ~1 hour before manipulating the door handles.

## Car Steering Wheels

Six volunteers were used for this experiment; each provided his or her own personal vehicle for the experiment. Cars with multiple routine drivers were not used. Each of the six car steering wheels was swabbed prior to the experiment. Each of the six volunteers then drove one of the other six cars for ~15-20 minutes. Each of the six car steering wheels was swabbed again. Volunteers did not wash their hands before driving the vehicles.

## Ligatures

Six volunteer pairs were used for this experiment. Prior to this experiment six lengths of electrical cord were cleaned with bleach and water. Six lengths of rope were cut from an

unused coil of nylon rope. For each pair a “victim” and an “assailant” were assigned. The “assailant” tied the “victim’s” wrists together using the rope. The rope was then cut off the victim and the locations most likely handled by the “assailant” during the tying were swabbed. Next, the “assailant” tied the “victim’s” wrists together using the electrical cords. The locations most likely handled by the “assailant” during the tying were swabbed before untying the “victim”. The volunteers designated as “assailants” were asked to wash their hands ~1 hour before tying the “victim’s” wrists together.

Prior to the collection of the swabs, 200 µl of sterile deionized water was aliquoted to each of a series of 1.5 mL tubes. Just before collection a sterile swab was removed from its packaging and the tip submerged in one of the prepared water aliquots. Excess water was shaken off, then the swab rubbed vigorously (with rotation) over the surface to be sampled. Active swabbing was carried out for as long as necessary for the transferred water to be almost completely reabsorbed by the swab. All swabs were consumed for DNA extraction. They were extracted using a standard organic extraction and quantified using the DOJ nuTH01-nuCSF-IPC qPCR Triplex assay run on the ABI 7500. The samples were amplified using the ABI Identifiler PCR amplification kit. Where possible, 1ng of each sample was amplified. When less than 1ng of DNA was recovered from an item, the extract was concentrated using a SpeedVac and consumed during amplification. The amplified product was analyzed using the ABI 3130 Genetic Analyzer.

## Results

Generally with both the pens and the door handles an uninterpretable mixture was obtained. This was true regardless of pen type or whether the door handle was pushed or pulled. Mixtures consisted of the profiles of at least two to five individuals—most often with no clear major contributor. In

### Author’s note:

A review of DNA transfer publications was recently published in *Forensic Science International: Genetics* (G. Meakin, A. Jamieson, DNA transfer: Review and implications for casework, *Forensic Sci. Int.* 7 (2013) 434-443). I think that this article is a good summary of the published work on the transfer of DNA and the ability (or inability) to detect STR profiles under different scenarios. These are questions that often come up during an investigation and/or trial in DNA casework. However, most of these studies do not address the relevance of detecting profiles from objects submitted for transfer DNA analysis. In 2007, a colleague and I did a small study to see if the DNA of the last person to touch a commonly handled item would be detected once that item was swabbed. An article was published in the California Department of Justice, Bureau of Forensic Services’ publication, *Tieline*, in 2008. In light of the recent *FSI: Genetics* article, I thought this might be of interest to our CAC membership. Although the results are what most of us would consider common sense, our goal was to use more realistic scenarios to address the usefulness of these types of samples.

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*This article first appeared in TIE-LINE, California Department of Justice, Bureau of Forensic Services, Vol. 28 (2008).*

the four instances where a major profile could be discerned, and in one where the profile appeared to be single source, that profile was inconsistent with that of the volunteer to last handle the object. At best our volunteers could not be excluded as a contributor to the mixture, but only in some cases.

With the car steering wheels we generally detected the car owner on the “pre-carjacking” swabs but only partial profiles were obtained—the larger molecular weight loci were often lost. The single instance of a complete profile was obtained from a dimpled steering wheel that was markedly different from the other, relatively smooth, steering wheels swabbed. From the “post-carjacking” swabs we obtained results ranging from no profile at all to a full two-person mixture (this from the dimpled steering wheel). Where a major profile was discerned, it corresponded to the car owner, not the volunteer to last drive the car. At best our volunteers could not be excluded as a contributor to the mixture, but only in some cases.

For the ligature experiment swabs our volunteers’ profiles were generally detected. In about half of the cases this was the major or only profile detected; in the other half, the volunteer “assailants” could not be excluded as contributors to the low-level mixtures obtained. Results were similar between the nylon rope and electrical cord swabs. The relative success in detecting the profiles of the volunteer “assailants” was attributed to the newness of the rope and the prior cleaning of the electric cords. Even so, minor alleles foreign to both our volunteer “assailants” and “victims” were detected in most of the mixtures. These alleles could not be attributed to the analysts.

From these experiments we conclude sampling for “trace DNA” is likely to be of limited utility if the intention is to determine the last person to handle an object. Transitory or limited contact does not appear to deposit much DNA. Conversely, if a habitual user’s profile is sought, such sampling may provide that profile.



## New BOD Policies

The CAC Board of Directors has approved three new policy statements that will be of benefit to our members:

1. The existing policy to offer a one-time reimbursement to our members for the ABC (American Board of Criminalistics) Exam application fee has been formalized.
2. The duties of one of the most important of the CAC’s committees, the Ethics Committee, have been codified.
3. The process by which consumable and durable good for seminars are purchased have been outlined to ensure fiscal vigilance. Visit [cacnews.org](http://cacnews.org) and click “Resources” for more info.

## CAC Southern Region

Long Beach Police Department will host the next CAC Southern Study Group Meeting; Elana Quinones will get back to me to confirm the date.

Eucen Fu would like to step down as the study group

chair for Toxicology; I’m in the process of finding a new chair/co-chair for this group.

—Mey Tann

## CAC Northern Region

The Northern Study groups will be meeting at UC Davis most likely in December. Michelle Hensley from Alameda County will be our new Crime Scene Study Group Chair. At this time, we are still looking to put the program together and would gladly accept any suggestions or contributions from the membership.

—Alice Neumann Hilker

## Resource for Science Teachers Announced

MurderAtOldFields.com was launched to the Internet at the most recent NSTA (National Science Teachers Association) conference in San Antonio, Texas in April to a welcoming reception by the forensic science teachers in attendance. Now the developers of MurderAtOldFields.com want to learn whether this online lab activity is suitable for basic level training for law enforcement and professional criminologists. If you are interested in a free “beta-tester” account of MurderAtOldFields.com and are willing to write a review of it, email the developers at [info@MurderAtOldFields.com](mailto:info@MurderAtOldFields.com) to request your free account. Free accounts will be issued to the first three CAC members who request them.

This new online forensic science lab activity is based on the facts of an historic double-murder that occurred in 1842 in Old Fields, Long Island. The online version is a complement to the “real world” kit which has been marketed by Ward’s Natural Science for the last two years. Students use the modern tools of forensic science to find evidence at the 3D crime scene, and analyze this evidence in the online virtual lab. Teachers monitor student progress as they work their way through the auto-graded lessons, quizzes, crime scene and labs and progress through to their determination as to which of the suspects committed the crime. It teaches a beginner’s level of techniques for Fingerprint Analysis, DNA Analysis, Blood Typing, Hair Analysis, and Shoe Impression.

MurderAtOldFields.com is a web-based tool delivered through a browser, no software needs to be installed, that uses html5 programming—not Flash. This makes it compatible with the latest versions of all major browsers and is also well-suited for use on iPads.

*If you are interested in “beta-testing” this function for free and writing a review of your experience, please send an email to [info@MurderAtOldFields.com](mailto:info@MurderAtOldFields.com) to request your free account. The developers will email you a login and password for you to get started.*

## CACBit Quiz Answer

One of these solid plastic filters is at the bottom of each Starbucks Single-Cup Serving used in Keurig coffee brewers. Now, here’s your additional challenge. The politically correct buzzword today is GREEN! After their intended use, we don’t want these solid plastic filters ending up in landfills! Whomever submits the recycled use judged best and most original (doesn’t have to be a use in criminalistics, although that would be nice), will have their use featured in a future issue.



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Contact: Chris Schneider or Meagan Gallagher  
Chris.Schneider@doj.ca.gov

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To learn more, see PerkinElmer at the CAC Fall Meeting or view this webinar *"Screening of Illicit Drugs in Seconds"* at [www.PerkinElmer.com/ForensicDSATOFWebinar](http://www.PerkinElmer.com/ForensicDSATOFWebinar)

