

# The CACNews

News of the California Association of Criminalists • First Quarter 2011



WORKSHOPS AT THE SEMINAR

# The President's Desk

## Giving Thanks

As I sit here consuming the last of my thanksgiving leftovers, I felt it was a good time to express my gratitude to a number of people in the CAC.

I thank the CAC founders for having the foresight to create an organization with a well organized Bylaws and a strong Code of Ethics that have served as models for many other forensic organizations. These documents continue to stand the test of time over fifty years later.

I thank the McLaughlin family for dedicating a generous endowment for the support of training and resources for our members. Each year several classes and workshop are supported by this fund and I have had the opportunity to attend several classes supported by this endowment. This month over a hundred members will have free tuition to an advanced DNA mixture interpretation workshop because of the McLaughlin's generous donation. Many student members have received scholarships or had their research supported due to these funds. On behalf of all CAC members, I am truly grateful for the opportunities that exist because of this endowment.

I thank the Forensic Science Society, with whom we have a longstanding relationship and with whom we will have a joint meeting this spring. Many CAC members, including myself, have had the opportunity to attend past joint meetings in California and in the UK. We have benefitted from the exchange of information and from the friendships we have made. I encourage our members to attend the upcoming joint meeting and to attend a meeting or two across the pond. It is a very rewarding experience and I assure you will be received warmly.

I also thank the FSSoc for allowing their journal, *Science and Justice*, to also serve as the official organ of our association. Many CAC members are apparently unaware that, in *Science and Justice*, we have a peer reviewed journal for the publication of original research, case studies and book reviews. I thank the CAC members who serve on the editorial board of *Science and Justice*, and I encourage CAC members to look first at this fine journal for submission of their articles for peer reviewed publication.

I thank the members of the CAC Board of Directors who have served with me for during the last year and a half. The CAC and forensic science as a whole recently have faced and will continue to face many changes and challenges due to the recommendations of the National Academies, the Crime Laboratory Review Task Force, and the White House's Subcommittee on Forensic Science. Scandals at the San Francisco Police Department and at other laboratories have increased scrutiny on the work we do and have put our Code of Ethics to the test. In particular I thank Jennifer Mihalovich and Mary Hong, who, as past presidents, have faced these challenges and have provided me guidance in my current position.

I thank the dedicated members serving on the many CAC committees, acting as CAC liaisons to other organizations, or representing the CAC on advisory or review boards. Much of the work of the CAC goes on behind the scenes by these, often unrecognized members. Some committee members have served for decades and I want to express my gratitude for their service.

I thank the individuals who have presented papers or conducted workshops at our CAC seminars. You have not only helped advance the first object of our association, to "foster an exchange of ideas and information within the field of criminalistics," you have helped expand the knowledge of our members and for this I am appreciative.

Finally, I thank the members of the CAC. Your membership keeps this organization strong and helps advance the field of criminalistics in California. I have met many of you at meetings, workshops and study groups and I thank you for your participation. I have become friends with a number of members that I likely would not have met without the CAC. I encourage those who are not active in the CAC to make an effort to attend more CAC meetings and functions. I am sure that I and other members can learn from you and we all benefit from the cooperation between laboratories and across disciplines. I am certain that through your participation in the CAC, you will find much to be thankful for as well.

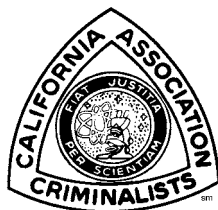
Many CAC members are apparently unaware that, in *Science and Justice*, we have a peer reviewed journal for the publication of original research, case studies and book reviews.



Adam Dutra  
CAC President

A handwritten signature in blue ink, appearing to read "ADutra", located at the bottom right of the page.

FIRST QUARTER 2011



**Editorial Secretary** Greg Matheson  
(323) 415-8112  
B8927@lapd.lacity.org

**Art Director** John Houde/Calico Press, LLC  
(206) 855-1903  
john@calicopress.com

**Technical** Jennifer Shen  
(619) 531-2655  
jshen@pd.sandiego.gov

**Webmasters** Mark Traughber, Eric Halsing  
(951) 361-5000  
webmaster@cacnews.org

**Advertising** Contact the Editor

The *CACNews*, ISSN 1525-3090, is published quarterly (January, April, July, and October) by the California Association of Criminalists (CAC).

The CAC is a private foundation dedicated to the furtherance of forensic science in both the public and private sectors.

Please direct editorial correspondence and requests for reprints to the editorial secretary.

Copyright © 2011 The California Association of Criminalists. All Rights Reserved.

Notice to Contributors: We publish material of interest to our readers and are pleased to receive manuscripts from potential authors. Meetings and course announcements, employment opportunities, etc. are also solicited. Advertisements are also accepted, although a fee is charged for their inclusion in *The CACNews*. Please contact the advertising editor for further information.

Submissions should be made in the form of Windows compatible files on CD or by e-mail. Alternatively, text files may be saved as plain ASCII files without formatting codes, e.g. bold, italic, etc. Graphics, sketches, photographs, etc. may also be placed into articles. Please contact the editorial secretary for details.

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

# The CACNews

www.cacnews.org



## On the cover...

CAC Member Philip Hess (r) demonstrates crime scene photography techniques at the recent CAC seminar in Oakland.

## INSIDE

"The President's Desk" <i>President Adam Dutra</i> .....	2
CACBits / Announcements / Classes.....	4
Editor's Desk: "Reaching Out to Our Stakeholders" <i>Greg Matheson</i> .....	5
"Feedback" <i>Letters to the Editor</i> .....	7
Proceedings of Lunch: "That's Not What We Meant" <i>Norah Rudin and Keith Inman</i> .....	9
The Poisoner's Handbook <i>Book Review by Greg Matheson</i> .....	12
"O Brother, Where Art Thou?" <i>Pamela Hoffsass</i> .....	14
Crossword Puzzle <i>John Houde</i> .....	17
Alameda Scrapbook .....	18
Ethical Dilemmas Discussion Corner <i>Carolyn Gannett</i> .....	25
Fresno Laboratory Alcohol Correlation Study <i>Greg Masters and Maria Woodcock</i> .....	26
Tracks in History <i>Ernest D. Hamm</i> .....	33
Seminar Abstracts .....	36



# CACBits



CAC Member Cherie Will describes the use of luminol in processing a crime scene where a Hollywood special effects technician is being investigated on "Family Secrets," an episode of "LA Forensics" (truTV).



## CAC Sends Rep to Washington

Jennifer Mihalovich (*above, left*) receives a CAC Service Award from President Adam Dutra for her participation on the Crime Laboratory Review Task Force. Also recognized were Barry Fisher, Dean Gialamas, Greg Matheson and Jeff Rodzen. Receiving Certificates of Appreciation for their work on the task force were Dolores Carr, Arturo Castro, Michael Chamberlain, Jennifer Friedman, Dane Gillette, Colleen Higgins, Robert Jarzen, Jim McLaughlin, William Thompson and Charlotte Wacker.

Ms. Mihalovich will be attending meetings of the White House's Subcommittee on Forensic Science Standards, Practices and Procedures Interagency Working Group. She was nominated by the CAC for this subcommittee and will provide us with status reports of the committee's activities.

## Bob Cravey 1925-2010

### Long-time OC Toxicologist

Robert Harold Cravey was born in Rhine, Georgia on October 23, 1925. He attended high school and college in Georgia, graduating from the University of Georgia with a bachelor's degree in chemistry in 1949. He worked as a microbiologist with the Georgia State Health Department and later the U.S. Public Health Service for several years. In 1955 he was called to active duty in the U.S. Air Force and was stationed at several base hospitals in the U.S. and abroad as a Clinical Laboratory Officer, until being assigned to the Armed Forces Institute of Pathology in Washington, DC, in 1962 for specialized training. There he spent three years under the tutelage of Dr. Leo Goldbaum as a forensic toxicologist. Shortly thereafter, he joined the newly-formed Laboratory of Criminalistics at the Orange County, California, Sheriff-Coroner's Office in Santa Ana as Chief Toxicologist. He remained in that position until his retirement in 1992.

Bob was very active in forensic toxicology, serving on numerous boards and committees of several professional societies. Among his more notable achievements, he was on the editorial boards of both the *Journal of Forensic Sciences* and the *Journal of Analytical Toxicology*, was a director of the American Board of Forensic Toxicology and Society of Forensic Toxicologists, chairman of the Toxicology Section for both the American Academy of Forensic Sciences and the International Association of Forensic Sciences, vice-president of the American Academy of Forensic Sciences and president of the California Association of Toxicologists and Forensic Sciences Foundation. He published over 60 scientific articles, authored more than a dozen book chapters and was co-author of five books, including *Courtroom Toxicology*, *Disposition of Toxic Drugs and Chemicals in Man* and *Introduction to Forensic Toxicology*.

Bob will be remembered by his colleagues and close friends for his quiet, unassuming manner and his genuine interest in their activities and personal well-being. He was a humble man who treated everyone with respect and who always spoke well of his peers. He was a true Southern gentleman. He was a friend to all, giving selflessly of his time and knowledge, asking nothing in return. Bob died on October 16, 2010 of natural causes and went without pain or suffering. Bob is survived by his domestic partner, Lonnie Dean and his French bulldog, Pudge. He will be sorely missed.

## Bylaws Change: e-Mail Approved

Passed at the fall 2010 business meeting was a change to the CAC bylaws that now allows official notifications of special and regular meetings of the membership to be made by email. This brings our bylaws into accord with the provisions of the Calif. Corporations Code.

# The Editor's Desk

## Reaching Out to Our Stakeholders

A few issues back I wrote about procrastination. Well, true to form, here it is the day before Thanksgiving, six days before the deadline for this issue and I am just now putting this editorial together. Looking at it in a positive light, I am six days early, and I can use the holiday to get sappy about how thankful I am to work in such an important and personally satisfying profession.

One of the issues regularly raised during the meetings of the California Forensic Science Task Force dealt with openness and transparency. Comments were made that the forensic science community in California was too closed and that a commission or oversight body was necessary to ensure openness. I and other laboratory representatives strongly disagreed. It is our contention that California is unique in the country in that we have professional organizations devoted to California forensic science and that the two organizations, along with laboratory accreditation, could perform most if not all of the functions of a state level commission.

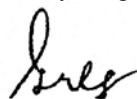
Early June of this year, the Task Force voted to put itself on hold for 12 to 18 months to see what came out of the federal working groups looking to forensic science and the possibility of federal legislation creating a forensic science body. It didn't make sense to duplicate efforts. However, we were also sensitive to the comments made about openness. We pointed out that each year the two professional organizations in California, the CAC and CACLD, both hold two seminars, conveniently located one in the north and one in the south. The seminars are open to the public. You don't need to be a member to attend and you don't even need to be a forensic scientist, supervisor or manager to attend. Task Force representatives were invited to attend the seminars to see for themselves how information is shared between California crime laboratories and how our business practices dealt with such things as ethical issues.

To take things a step further, the CACLD has actively sought direct interaction between their organization and its stakeholders. Recently, the CACLD and California District Attorneys Association (CDAA) have agreed to have representatives present at each other's official events. The CACLD has identified a representative to the CDAA and the CDAA has identified two representatives to the CACLD who will be attending CACLD meetings, one in the north and one in the south. The CDAA northern representative recently attended the CACLD meeting in San Mateo and became an active participant in discussions. The CACLD meeting attendees benefited from the presence of one of our stakeholders. I am sure CACLD would welcome participation from the CDAA's equivalent from the defense community.

The CACLD has taken an important step in reaching out to our stakeholders. CAC should do the same.

On the national front, the American Society of Crime Laboratory Directors (ASCLD) is reaching out to national level stakeholder organizations. As the representative of America's forensic science laboratory's supervision and management, ASCLD is in a unique position to provide our stakeholders with a national perspective of the needs of the forensic science community. As ASCLD president I recently had the opportunity to speak before the National District Attorneys Association and offer our knowledge and expertise on forensic science issues including issues directly affecting the case working criminalist.

I managed to continue my procrastinating. My six-day buffer is gone and this editorial is being finished on the deadline day. Again, looking at the positive side, it is now December and the end of the year is approaching. Therefore, I can wish you all a Happy Holidays and a great 2011. If you are into making resolutions, may I suggest make one of them to get professionally involved in 2011.



Task Force representatives were invited to attend the seminars to see for themselves how information is shared between California crime laboratories and how our business practices dealt with such things as ethical issues.



**Greg Matheson**  
CAC Editorial Secretary

## Regional Director South Report

San Diego PD hosted the August study group meeting in San Diego at National University on August 11, 2010. The speaker was Patrick O'Donnell of San Diego PD who spoke on "Serial Drug Cartel Kidnappings and Homicides in San Diego, its Origin in Mexico's Narcotics Trade and Implications for the Safety and Security of all Residents of the United States." The meeting was well attended. Approximately 75 people attended the lunch and presentation. Of the study groups that met, Trace had 10 attendees, CSI, 22, Drugs and Toxicology, 15. I do not have the figures for DNA or Firearms. The next study group meeting will be scheduled for December 7, 2010, with Cal State LA hosting. Kathy Roberts will be coordinating and a speaker is scheduled but no word yet on who the speaker will be or what the presentation topic will be.

A chair position has become available in the Blood Alcohol Study Group. Please contact me if you would like to volunteer or need more information.

Mey Tann  
mey.tann@doj.ca.gov

## 2011 SOFT-TIAFT Meeting

California is getting ready to host the world's forensic toxicologists in 2011. The 2011 Joint Meeting of the Society of Forensic Toxicologists (SOFT) and The International Association of Forensic Toxicologists (TIAFT) will take place in San Francisco, California from 25 to 30 September 2011.

The conference venue will be the San Francisco Marriott Marquis Hotel located in downtown San Francisco. Tentative schedule include: Joint SOFT—TIAFT Young Toxicologists Day, Two full days of workshops, three full days of scientific sessions with platform and poster sessions, "The Streets of San Francisco", "Escape To Alcatraz" and the Presidents' "Uniting Nations" Gala Dinner. For more information including opportunities for exhibitors and sponsors, please visit [www.toxicology2011.org](http://www.toxicology2011.org).



Gary Sims (r)



Pamela Hoffsass (l)



Mark Bennett (l)



Robert Binz



John Murdock

## Banquet A Night of Recognition

One of the highlights of the seminar banquet is the recognition of outstanding members. Gary Sims (DOJ Jan Bashinski DNA Lab) was awarded the Anthony Longhetti Distinguished Member Award, Robert Binz (OC Crime Lab) was awarded the Paul Kirk/Presidents Award, Mark Bennett (Oakland PD) earned the Alfred Basiotti Outstanding Presentation Award for his Spring 2010 paper, "Forensic Investigation of the Shooting Deaths of Four Oakland Police Officers on March 21st 2009." Pamela Hoffsass (San Francisco PD) also received the Biasotti award for her Fall 2009 paper, "O Brother, Where Art Thou?" (*published in this issue*).

A CAC Life Membership was bestowed upon John Murdock. He is only the 23rd member to receive this honor.

There's a lot more information about all the CAC awards on our website: [www.cacnews.org](http://www.cacnews.org).



## Speaker Gave Wrong Impression

While attending the CAC Seminar in Oakland, I listened to a presentation entitled *The Implications of Suppressed, Falsified or Undisclosed Lab Information in Litigation: A Review of the Law and Practicalities* by John Philipsborn, an attorney. Mr. Philipsborn discussed the *Brady* obligation, which is the prosecution's responsibility to disclose any evidence that may be favorable to an accused person regardless of whether or not the defense requests the information.

While Mr. Philipsborn was informative with matters relating to *Brady* law, he is not familiar with the situation at the San Francisco Police Department's Criminalistics Laboratory. According to him, the scandal was not that a "senior analyst" was stealing drugs for personal use, but rather that laboratory documents provided to the defense, which included proficiency tests and standard operating procedures, were "bargain basement." Unfortunately, Mr. Philipsborn did not expand on what he thought should have been provided, nor was he clear on how the quality of standard documents could have been improved.

Mr. Philipsborn also made a comment that the American Society of Crime Laboratory Directors – Laboratory Accreditation Board (ASCLD-LAB) "pulled the lab's accreditation", leading some in the audience to believe that the SFPD Crime Lab is no longer accredited. This statement is completely false.<sup>1</sup>

What happened in the case of the SFPD crime lab was that the ASCLD-LAB team came to the lab for the accreditation, had findings which the lab was supposed to fix, Ms. Madden's actions in the controlled substances unit came to light, and the San Francisco Police Chief (not ASCLD-LAB) closed the controlled substances unit. The ASCLD-LAB team then returned to the lab to review corrections to the findings after an extension had been granted. At no point was the lab's accreditation "pulled." The SFPD crime lab remains an accredited laboratory and still performs quality casework.

Mr. Philipsborn began his next attack by telling his audience that they all know that determining the weights of controlled substances is important. This is an undeniable fact, but that is where the truth ends. Mr. Philipsborn is under the sad misconception that the controlled substances balances used in casework were not calibrated. Balance calibrations were checked monthly by staff in this unit. Per the ASCLD-LAB Inspection Report it was found that "in two instances balances [had] been taken out of service for errors without initiating a review and following the laboratory corrective action procedure." The two balances that were taken out of service could not be powered and therefore could not function at all. The balances were not out of calibrations and there were no "errors" in weighing. Removing balances from use without documentation is far different than using non-calibrated balances, which was Mr. Philipsborn's insinuation. It is unknown to me where such erroneous and false information was obtained from, as the initial findings to ASCLD-LAB's

<sup>1</sup>As many of you know ASCLD-LAB accredits on what I like to call an "all or nothing" basis. If one unit in a laboratory fails accreditation, the whole lab fails accreditation. Some other accrediting bodies can certify one unit (for example the firearms unit), of a multi-unit laboratory (a lab that may have a DNA unit, firearms unit, controlled substances, etc.). But ASCLD-LAB does not do that.

Mr. Philipsborn began his next attack by telling his audience that they all know that determining the weights of controlled substances is important. This is an undeniable fact, but that is where the truth ends.

inspection were made public by the SFPD Chief of Police for all to read. It could very well be that either Mr. Philipsborn did not take the time to read the document and relied on word of mouth or "spun" information from the press, or simply just did not understand the document, when trying to provide "evidence" of a violation of *Brady* Law.

*Brady* law is very important to criminalists as it shows us the importance of honesty, transparency and impartiality in the field of forensic science. What Mr. Philipsborn failed to touch on, which is also important, was that under *Brady*, the credibility of the expert (such as a criminalist) might come under scrutiny. For example, a mistake on the job or the criminal history of the expert is all fair game when it comes to *Brady*. Mr. Philipsborn used examples where he failed to make the connection to *Brady* Law, which is supposed to disclose information favorable to the accused. Rather than giving examples where exculpatory information was withheld, and the accused was wrongly imprisoned, he tried to portray mistakes as misconduct and laboratories' shortcomings as intentional deception.

It was unfortunate that Mr. Philipsborn left the podium so quickly after his presentation and did not allow for an open forum of questions, as I'm sure that he would have had many to answer. I for one would have asked from where he received his information about the SFPD crime laboratory, and would have respectfully tried to correct him rather than allowing him to spread erroneous information.

Mignon Dunbar  
San Francisco P. D. Criminalistics Lab.

## "Experience Fallacy" Fallacy

With every issue of the *CACNews* I look forward to reading "The Proceedings of Lunch." I may not always agree with the opinions of Norah, Keith, and their occasional guest, but I nevertheless always find their offerings very thought provoking. Their "The Experience Fallacy" [4th Quarter, 2010] was even more stimulating than usual.

Had they not in the article's title chosen to use "Fallacy", I would not have been moved to pen this polemic. I agree with many of their points. I'm often not very popular with firearms and toolmarks examiners because I show obvious disdain for their refusal to provide documentation and in-court illustration of how they reach their conclusions. The same goes for other areas of forensic science when essentially in their testimony they are saying "trust me—I'm an expert."

But "Fallacy" just sticks in my craw. Had this been a piece written by some hack and appearing in something like *People* magazine or in the some supermarket tabloid such as

the *National Enquirer*, I would have just ignored it. But in forensics (i.e. things having to do with questions at law), we know that words have very precise meanings. A writer of mystery novels might have no qualms whatsoever in using Roget's Thesaurus, but in the law that just isn't good enough.

Just what does "fallacy" mean? There are many definitions available at various online dictionaries, but one definition given by Merriam-Webster (yes, I'm cherry picking) is: (noun): an often plausible argument using false or invalid inference. So I think it's fair to say that the average person (juror?) associates fallacy with false. I realize that in the body of the article they back off from this a bit (i.e. – experience is not completely without value), but any attorney using this in court will only quote the title.

Had the title instead been, The Experience Imprecision, I would have no quibbles. I know that my own memory is far less than perfect. When I began my career in criminalistics in 1971, I began a logbook listing brief details of every case I worked. I kept it up until 1989 when I transferred to the Navy's crime lab in San Diego. A few years ago I was wondering just how many cases I had worked that involved the detection and comparison of traces of rubber. I had an approximate number in my mind, but I went back through my logbook and counted. My estimate was short by two. So my memory is imperfect—so what? Is "no memory" preferable to an "imperfect memory"? [I was however correct in saying that "No, I have never worked a case involving the comparison of rubber traces from rubber baby buggy bumpers."]

Many people discover Ayn Rand (*Atlas Shrugged*, *The Fountainhead*) sometime between their sophomore years in high school and college. Then the majority of them mature. Sadly (or gladly), I'm still very immature. I remain a great fan.

In one of Rand's works (yes, I've forgotten the reference) she said that to really test any theory or proposition you needed to take it to extremes. If it still held up when taken to extremes then perhaps you had something. So let's take The Experience Fallacy to extremes. In 2009 it was discovered that my wife had a very serious neurological problem. However, the good news was that it could be treated by brain surgery. Our health insurance was through Kaiser and in San Diego they had four neurosurgeons on staff. We were allowed to select which of the four would perform the surgery. We could go online and read about the education, training, board certification, specialties, etc. of each. Do you think "experience" was a non-factor in our ultimate decision? Happily, all went well and today my wife is doing fine.

Another example: About twenty years ago Dr. Henry Lee was in San Diego to testify in a homicide case. Neither I nor the Navy had anything to do with the case, but my lab director (Brandon Armstrong) and I felt that to sit in on his testimony would be excellent training. Dr. Lee's voir dire seemed to take hours because his CV was about 60 pages (yes, I don't recall the exact number) and it seemed like he mentioned every book, journal publication, and award he had ever received. Now if all that past experience is of no value, we could greatly speed up the process and help unclog the court system if we just eliminated any references to experience in voir dire. And since the jury might be wrongly inclined to think that a great deal of past experience would mean more trustworthy findings, at the very least shouldn't the jury be excluded during *voir dire*?

What about the reconstruction of how a suspicious death (homicide? suicide? accident?) most likely occurred? Occam's

razor says "the simplest explanation is usually the right one." But isn't Occam's razor really just past experience?

Bob Blackledge  
bigpurple@cox.net

The CACNews prints letters to the editor that are of interest to our readers. We reserve the right to edit letters for brevity and clarity. The opinions expressed are those of the writer and do not necessarily represent those of the CAC.

### **Mobster Tomato Garden:**

An old "family" man lived alone in New Jersey. He wanted to plant his annual tomato garden, but it was very difficult work, as the ground was hard. His only son, Vincent, who used to help him, was in prison. The old man wrote a letter to his son and described his predicament:

Dear Vincent,  
I am feeling pretty sad, because it looks like I won't be able to plant my tomato garden this year. I'm just getting too old to be digging up a garden plot. I know if you were here my troubles would be over.. I know you would be happy to dig the plot for me, like in the old days.  
Love, Papa

A few days later he received a letter from his son.

Dear Pop,  
Don't dig up that garden. That's where the bodies are buried..  
Love, Vinnie

At 4 a.m. the next morning, FBI agents and local police arrived and dug up the entire area without finding any bodies. They apologised to the old man and left. That same day the old man received another letter from his son.

Dear Pop,  
Go ahead and plant the tomatoes now. That's the best I could do under the circumstances.  
Love you, Vinnie

Registering for a CAC Seminar is now so easy—  
a lab rat could do it!\*

**seminar.cacnews.org**



\*lab rat not included



## **That's Not What We Meant: Sequential Unmasking Revisited**



In December of 2007 a seminal group of 11 individuals met in Washington D.C. to discuss the issue of blinding a forensic analyst to certain case information. In a rare meeting of minds, this interdisciplinary group comprised individuals with expertise in law, psychology, economics, DNA, statistics, and forensic science. The various participants brought an academic as well as a practical perspective to the problem. The product of an intense two days, during which most waking hours were spent around a conference room table, was the now well-known letter to the editor of *JFS*, entitled *Sequential Unmasking: A Means of Minimizing Observer Effects in Forensic DNA Interpretation* (2008).

While we expected varied reactions to our proposal that case information extraneous to the analysis be revealed to the analyst in an orderly and documented fashion, we were, perhaps naively, quite surprised at the apparent lack of understanding of our model. It almost seemed like many people read a different letter than the one we wrote; those who have offered their reaction either in writing (Ostrum 2008, 2009, Wells 2009, Budowle 2009, Thornton 2010) or during oral presentations (Budowle 2010) complain about proposals that we never offered and certainly never meant. How is it possible that we communicated our vision so poorly?

### **Why do forensic scientists react negatively to the idea of blind testing?**

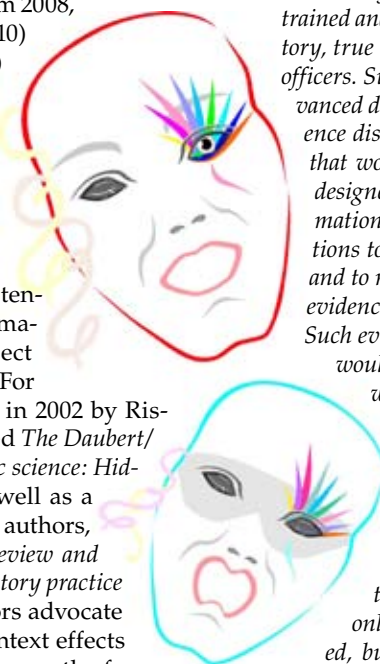
One answer may lie, ironically, in the tendency of all human beings to exhibit confirmatory bias. In plain terms, we hear what we expect to hear, and we read what we expect to read. For example, many of us read an article, written in 2002 by Risinger, Saks, Thompson, and Rosenthal, entitled *The Daubert/Kumho Implications of Observer effects in forensic science: Hidden problems of expectation and suggestion*, as well as a subsequent paper written in 2003 by the same authors, entitled *Context effects in forensic science: A review and application of the science of science to crime laboratory practice in the United States*. In these papers, the authors advocate "blind-testing" to minimize any potential context effects that full access to case information might have on the forensic examiner. That phrase struck fear into the hearts of many forensic examiners, including us. Were we to be reduced to mere technicians while law enforcement or legal personnel made all the important decisions? What about information we truly needed to know to competently come to complete

conclusions? What if I make a frank mistake that would have been readily obvious if I had access to case information? Who are THEY to tell US how to do our jobs?

A calmer reading reveals that the authors never intended any of the above. Instead, the model they propose suggests that "good practice might require sharing information in stages—giving examiners certain information necessary to performing a test, and subsequent to obtaining those results provide additional information that might lead to further testing. Doing so protects the soundness of the early testing without losing the benefit of the later testing." (Saks, 2003)

And, in a foreshadowing of the case manager role recommended in our **sequential unmasking** protocol, they propose that:

*The most important change would be to convert the personnel in the evidence intake unit from fundamentally clerical personnel to the most highly trained and highly respected personnel in the laboratory, true 'Evidence Control' and 'Quality Control' officers. Such officers should be required to have advanced degrees in an appropriate conventional science discipline, and to undergo rigorous training that would allow them to implement a program designed to filter out domain-irrelevant information from submissions, to formulate the questions to be answered in the least suggestive way, and to route and coordinate the submission of the evidence to the appropriate section or sections. Such evidence and quality control (EQC) officers would be responsible not only for coordinating work among examiners in different specialties, but would be the sole contact point between the entity requesting the test and the laboratory, and would serve as the filter between each examiner and any information about the case, whether it originated from without or from within the lab. These officers would decide not only generally what kinds of tests were needed, but would decide what information about the case was needed by the examiner assigned to do those tests, and one of their primary duties would be maintaining appropriate masking between the examiners doing the actual tests and all sources of domain-irrelevant information. Those decisions and actions would be documented in the case file.*



*Nothing in this process prevents the EQC officers from learning what needs to be learned about the case from police investigators, nor does it prevent internal consultation among examiners to make sense of the findings, after the initial round of tests, and usually there is nothing to preclude additional tests. All of that would be documented, so that it could be known how blind or non-blind any given test was. (Saks, 2003)*

Simply put, in a re-read of these papers, we could find nothing suggesting that forensic scientists should be forever and enduringly deprived of case information. But many of us were so put off by the our own interpretation of “blind testing” that we formed an initial opinion, and, in spite of overwhelming evidence to the contrary (readily available if one were to simply read the details of the model absent the emotional context), failed to update our opinion based on current data. This is, ironically, the textbook definition of confirmation bias.

The authors of this pair of papers may have inadvertently made a mistake by using a very specific and narrow term well-known in the scientific arena, “blind testing,” and then attempted to expand its application to forensic science. Most readers, especially upon an initial or quick review, would have focused only on this term and failed to notice, understand, or internalize the expanded discussion that followed. This was one reason why we deliberately changed the terminology in our 2008 letter. (Krane et al., 2008) However, perhaps we also made a mistake in our choice of sequential UNmasking—apparently many focus on the masking aspect and fail to notice either the modifier or the word preceding it. Maybe “sequential revelation” would have been a better choice.

Our predilection for assuming that the authors meant us ill was exacerbated by the fact that three of the four authors (Saks, Risinger, Thompson) had already gained (deserved or not) a reputation as enemies of forensic science. Most forensic scientists would have been unfamiliar with the remaining author, Robert Rosenthal. Dr. Rosenthal is, in fact, one of the most highly respected cognitive psychologists in his field, and is credited as a pioneer in studying observer effects and context bias. Other than co-authoring these papers, he has had no interaction with forensic science. In other words, he has no dog in this fight; context effects in forensic science was, to him, just another example, in a long line of examples, of the human tendency to confirm expectations. In his seminal paper, *How often are our numbers wrong?* (1978), Rosenthal encapsulated the core of his synthesis:

*Put simply, good scientific practice is to 'keep the processes of data collection and analysis as blind as possible for as long as possible.*

More than three decades later, this pithy summary remains current and relevant.

### Sequential UNmasking

We had hoped to preemptively allay the almost primal fear of blind testing by renaming the concept to more accurately portray the model. As we naively thought would be communicated by the name, the idea is not to deprive the analyst of information required for a complete and competent analysis, but rather to strengthen the analysis by sequentially revealing relevant information in stages, carefully documenting observations and conclusions prior to each new revela-

tion. Perhaps it was, in part, the summary nature of a letter to the editor, but we were apparently stunningly unsuccessful in communicating our vision. We would like to take this opportunity to try to expand and clarify.

### The case manager approach

Apparently some of our colleagues have interpreted “a qualified individual familiar with case information” as either a non-scientist completely external to the laboratory or a laboratory administrator. Another extrapolation seems to be that the case manager is a fixed position and, as such, deprives the laboratory of the full breadth of experience of its examiners. Neither of those schemes are what we intended, but we can understand how people’s preconceptions could fill the void left by our abbreviated description. The original papers (Risinger et al., 2002, Saks et al., 2003) actually provide a better description of what we had in mind, that a case manager would, in fact, be a highly qualified individual with great breadth and depth of education, training, and experience, so as to have the expertise to make highly informed judgments about directing evidence analysis. Further, we do not assume that this is necessarily a single individual. Rather, although we failed to describe this, we envisioned the case manager as a role rather than a job description; this role could easily be rotated amongst qualified staff, providing analysts with the experience of overseeing different cases, and affording the laboratory the opportunity to benefit from the talents of various staff.

### How do we determine what information is domain-relevant, what information is domain-irrelevant, and who determines it?

And what is “domain-relevant” anyway? There has been a fair amount of consternation about this concept and the fact that we did not pursue a detailed discussion of it and how to implement it in an evidence examination protocol. While we assumed that we were paving the way for future work, we also understand the frustration of some readers that we did not provide an ultimate and final solution. While we were prepared for the usual push-back to an unfamiliar concept, we were somewhat surprised by the lack of curiosity as to how these ideas might benefit the forensic community. The terms “domain-relevant” and “domain-irrelevant” were introduced in the 2002 paper and are probably better defined dynamically rather than absolutely. In other words, although we can provide some examples and general guidelines, determining relevancy on a case-by-case basis is, in fact, one of the roles of the case manager.

Obvious examples with which we believe most people would agree, are things like: the physical evidence examiner doesn’t need to know that the suspect has a rap sheet 12 miles long, or that he has confessed to the crime, or that eyewitness reports place him at the scene. Yet this type of information is regularly included in sensational fashion on requests for evidence examination. A generalization of such a request is to name the suspect as the factual perpetrator of the crime, and to please find the suspect’s DNA on the swab from the victim because he is a flight risk and DNA results are required to arrest and charge. You’ve all seen specific variations of this transmittal.

At the other end of the spectrum is something like the results of a related analysis. For example, a gun is tested for

both DNA and fingerprints. The DNA and the fingerprints come back to different individuals. We would not want to take the chance that either analyst would be influenced by the conclusions of the other, especially if the evidence is ambiguous. However, clearly, someone has to eventually think about an explanation for the apparently discrepant results. Was there an error in collection or analysis? Were different areas of the gun sampled? Is there some other case-related possible explanation that could reconcile the results? Again, this is the value of the case manager. But ultimately, after each discipline-specific examiner has completed her analysis, and documented her results and conclusions, no reason exists to withhold this information, or not to solicit her input, as to explanations for the apparent discrepancy. The solution lies in the orderly sequence of unmasking information, and careful and complete documentation of data, interpretations and conclusions at each step.

The most important point, however, is that general guidelines for assessing domain-relevant information must be determined from within each discipline. They cannot and should not be imposed from above or from outside the discipline. That would be a recipe for disaster. Only those intimately involved in the examination and analysis of a particular type of evidence know what information is intrinsic and essential to an initial analysis or comparison, and which information can be revealed at later stages in the process to optimize the sequential unmasking procedure for the best analysis with the least opportunity for bias.

### **What about the gray areas?**

Truthfully, it is forensic science; most of it is gray. Nevertheless, we have been legitimately queried about the more difficult situations, information that could introduce bias, but could also be important to decision making and interpretation. It is important to realize that relevancy is neither absolute nor enduring. Again, the key lies in the sequential nature of the unmasking of information, and documentation at each step. If someone wants to argue later that a conclusion was changed due to the introduction of some particular piece of information, the process will be transparent.

### **How might sequential unmasking be extended beyond biological evidence and DNA to other disciplines?**

A common complaint is that the original sequential unmasking letter addressed only DNA analysis. While we mentioned that the protocol could and should be applied to other disciplines, we did make a conscious choice to use biological evidence as our initial model. Because the analysis of biological evidence is already more standardized, it is easier to understand how a sequential unmasking type schema might be instituted. This is standard practice in science, to model on a simpler system before extending to a more complex system. Our intention was for the 2008 sequential unmasking proposal to initiate the discussion rather than to supply an endpoint.

### **Why is there a different standard for defense review than primary prosecution examination of evidence?**

Actually, we never said, or even implied, anything of the kind, but this is a common accusation that we hear. (Budowle 2010) It would be naïve to suggest that a defense review is ex-

actly the same as the initial prosecution analysis. Presumably (or at least ideally) some sort of second read has already taken place, as well as a technical review and an administrative review. Only a very small proportion of cases ever filter out to independent review, and, for obvious reasons, they tend to be the more complex, ambiguous or contentious cases. So, *a priori*, those of us who perform independent review expect that there may be some sort of interpretational difficulty.

Nevertheless, for those who work in a laboratory or in an office with more than a sole practitioner, no reason exists why a similar sequential unmasking protocol should not be employed, with a colleague acting as case manager, and revealing information after each previous step is documented. Really, the challenge is for those who work as sole practitioners, where even a preliminary conversation with the attorney may reveal at least some case information. The one of us who finds herself in this situation always insists on re-analyzing electronic data blind prior to reading laboratory report or notes, and certainly prior to delving into investigative details. However, this is clearly not a perfect system. We can think of some models for making the administration of case information cleaner for independent practitioners; for example, a collaborative clearing house where sole practitioners act as case managers for each other.

Implementing sequential unmasking for sole practitioners is even more of a challenge than for crime laboratories. However, the goal should be to apply such a standard universally, and all of us should do what we can now, and work to move toward that goal.

### **How dare you insult me by insinuating that I am biased, and further, that I can't overcome any potentially biasing influences simply by remaining vigilant.**

That human beings are subject to subconscious bias is neither an insult nor an insinuation. It has been amply demonstrated, and is supported by a plethora of cognitive psychology research. (also see our response to Thornton, Thompson *et al.*, 2011) Forensic scientists are a sub-set of human beings, hence subject to those influences as well. And we can't counter something of which we are unaware because it takes place at a subconscious level. If we wish to be accepted as a legitimate, mature profession, we must join other applied sciences in employing measures that minimize our exposure to biasing influences. In the short term, it may feel difficult, strange and unnecessary; in the long term, we are protecting ourselves from both the perception and reality of subjective interpretations

### **References**

- Budowle B, NIJ Pattern Evidence Symposium, Clearwater, FL, 2010
- Budowle B, Bottrell MC, Bunch SG, Fram R, Harrison D, Meagher S, Oien CT, Peterson PE, Seiger DP, Smith MB, Smrz MA, Soltis GL, Stacey RB. A perspective on errors, bias, and interpretation in the forensic sciences and direction for continuing advancement. *J Forensic Sci* 2009;54(4):798-809.
- Krane, DE, Ford, S, Gilder, J, Inman, K, Jamieson, A, Koppl, R, Kornfield, I, Risinger, DM, Rudin, N, Taylor, MS & Thompson, WC. Commentary on Budowle, et al. A perspective on errors, bias and interpretation in the forensic sciences and directions for continuing advancement. [*J Forensic Sci* 2009;54(4):798-809] *J Forens Sci* 2010;55(1):273-274.



Krane, DE, Ford, S, Gilder, J, Inman, K, Jamieson, A, Koppl, R, Kornfield, I, Risinger, DM, Rudin, N, Taylor, MS & Thompson, WC. Sequential unmasking: A means of minimizing observer effects in forensic DNA interpretation. *J Forens Sci* 2008;53(4):1006-7.

Wells, JD, Commentary on: Krane DE, Ford S, Gilder JR, Inman K, Jamieson A, Koppl R, Kornfield IL, Risinger DM, Rudin N, Taylor MS, Thompson WC. Sequential unmasking: a means of minimizing observer effects in forensic DNA interpretation. [*J Forensic Sci* 2008;53(4):1006-7] *J Forensic Sci*, March 2009, Vol. 54, No. 2.

Krane, D, et al., Author's Response to Wells JD. Commentary on: sequential unmasking: a means of minimizing observer effects in forensic DNA interpretation. [*J Forensic Sci* 2009;54(2):500] *J Forensic Sci*, March 2009, Vol. 54, No. 2.

Ostrum, B, Commentary on: Authors' Response [*J Forensic Sci* 2009; 54(2):501] to Wells' comments [*J Forensic Sci* 2009;54(2):500] regarding Krane DE, Ford S, Gilder JR, Inman K, Jamieson A, Koppl R, Kornfield IL, Risinger DM, Rudin N, Taylor MS, Thompson WC. Sequential unmasking: a means of minimizing observer effects in forensic DNA interpretation. *J Forensic Sci* 2008;53(4):1006-7.

Ostrum B. Commentary on: sequential unmasking: a means of minimizing observer effects in forensic DNA interpretation. *J Forensic Sci* 2009;54(6).

Krane, D, et al., Authors' Response to Ostrum B. Commentary on: sequential unmasking: a means of minimizing observer effects in forensic DNA interpretation. [*J Forensic Sci* 2009;54(6)] *J Forensic Sci*, November 2009, Vol. 54, No. 6.

Risinger, DM, Saks, MJ, Thompson, WC, & Rosenthal, R. The Daubert/Kumho implication of observer effects in forensic science: The Hidden problems of expectation and suggestion. *California Law Review* 2002;90(1)

Rosenthal R. How often are our numbers wrong? *American Psychologist*. 1978;33(11):1005-1008

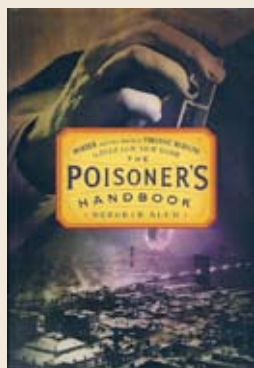
Saks MJ, Risinger, DM, Rosenthal, R, & Thompson, WC. Context effects in forensic science. *Sci & Just*. 2003;43(2):77-90.

Thornton, JI. Letter to the Editor—A rejection of “working blind” as a cure for contextual bias. *J. Forensic Sci*. 2010; 55(6): 1663.

Thompson, WC, Ford, S, Gilder, J, Inman, K, Jamieson, A, Koppl, R, Kornfield, I, Krane, D, Mnookin, J, Risinger, DM, Rudin, N, Saks, M, Zabell, SA, Reply to Thornton's “A rejection of “working blind” as a cure for contextual bias,” in print, *J. Forensic Sci* 2011;56(2).

## Wet Chemistry

BOOK REVIEW BY GREG MATHESON



ISBN-13: 9781594202438  
\$29.95 Penguin Press

***The Poisoner's Handbook:  
Murder and the Birth of Forensic  
Medicine in Jazz Age New York***  
by Deborah Blum

Modern forensic science is amazing. Using sophisticated instrumentation and well established methods we are able to determine significant amounts of information from all kinds of evidence. We take for granted the tools we have available to us today and forget about the roots of forensic science when the only tools were collectively called “wet chemistry.”

Last Father's Day my son gave me a copy of the book *The Poisoner's Handbook: Murder and the Birth of Forensic Medicine in Jazz Age New York* by Deborah Blum. By writing about the development of forensic techniques placed against the backdrop of New York in the early 1900's, Deborah Blum provides the reader with a thorough and entertaining perspective of the birth of forensic toxicology and the many poisons available from the 1910's through the 1930's.

*The Poisoner's Handbook* follows a dual literary path. Chronologically it follows the careers of Charles Norris, the first Chief Medical Examiner of New York, and Alexander Gettler, New York's dedicated and groundbreaking Chief Toxicologist. In addition, Ms. Blum highlights the use of poisons popular in each of the three decades covered by the book. Each chapter focuses on a specific poison, its use and

ultimately the identification of the poison in the human body by the New York City Medical Examiner's Office. The judicious use of actual case stories ties together the illegal use of a poison, the chemical identification process, and ultimately the offering of the analysis as evidence in a court of law.

Along with the many poisons murderer's used as their weapon of choice, Ms. Blum writes about poisons utilized by government and industry which inflicted illness and death on the populace. I found particularly interesting the effect Prohibition had on the increased use of methanol and ethanol poisoning and the role forensic toxicology played during that time.

As a forensic scientist, I found it interesting to compare how Norris and Gettler performed their jobs in the '20s and 30's versus how we do it today. Not just the difference between the wet chemistry of the time and the instrumental techniques we use today. But also how they created their own chemical tests, built their own analytical tools, and purchased their own reagents and supplies.

Fifty-two people reviewed the *Poisoner's Handbook* on Amazon.com with an average rating of 4.5 out of five stars. A great rating for a science based, non-fiction work. I found reading the reviews interesting. In particular, the comment of one of the two people giving the book only a two star rating is reason enough for most criminalists to find the *Poisoner's Handbook* an interesting read. If you can ignore the occasional, but rare, scientific error, who wouldn't like a book with a review that states “too much (somewhat disgusting) descriptions of how the physicians went about analyzing each sample by dicing, grinding, heating, cooling, etc. etc. each one of the organs of the deceased”?

I can't honestly say I finished the book over a weekend because I couldn't put it down, but I can say I thoroughly enjoyed the time I spent reading *The Poisoner's Handbook* and recommend it to everyone reading this review.

# SET SAIL SPRING 2011

The Scientific Services Bureau of the Los Angeles Sheriff's Dept. invites you to a truly one-of-a-kind CAC Seminar...

## CSI WORKSHOP

Crime scene sketching techniques and crime scene scenario analysis: First, practice your skills and learn some useful tips for efficient and accurate crime scene sketching! Then, challenge your critical thinking skills with a crime scene presentation by James Stam – is it homicide or suicide? Find out by signing up for this half-day workshop!

## DNA WORKSHOP

This one-day workshop will cover current technologies in forensic biology, including presentation of LASD's Prep-File validation. Interesting and unusual case experiences will also be discussed.

## FIREARMS WORKSHOP:

Ruger Mini-14 and P-Series Armorer Course: This two-day armorer course will consist of both lectures and hands-on exercises pertaining to the operation of the firearms, detailed assembly and disassembly, troubleshooting, and maintenance. Class size is limited so register for this workshop early!

## TRACE EVIDENCE WORKSHOP

Presented by Jenny Smith, Missouri State Highway Patrol Crime Laboratory. This one-day workshop will focus on the analysis of pressure-sensitive tapes commonly received as forensic evidence. A variety of materials and different instrumental methods for analysis will be discussed with an emphasis on those exams that are most discriminating. Limited to 20 participants.



## QUALITY ASSURANCE WORKSHOP

The Management System: Integrating Laboratory Management and Supervisors with QA.

Geared toward quality assurance personnel, this half-day workshop will offer QA Managers an opportunity to learn how to better work with their laboratory management and supervisors to achieve the ultimate goal of attaining or maintaining current accreditation. This is a great opportunity to work with other QA managers to share possible issues you might be experiencing and obtain new ideas for how to bridge the gap between QA and management and make the accreditation process more of a team effort.

## GENERAL TECHNICAL SESSION HIGHLIGHTS:

Don't miss out on a five-member panel discussion covering current legal issues in forensic science. The panel will include a judge, district attorney, defense attorney, and two criminalists. Hear their opinions on the latest changes to affect the field and get your questions answered!

Several interesting case examples will be presented, including the case of serial killer Rodney Alcala presented by DDA Gina Satriano from LA County and DDA Matthew Murphy from Orange County.

More presentations, papers and topics are being added; check [www.cacnews.org](http://www.cacnews.org) for the most up to date information!

CAC Spring Seminar · Long Beach, CA · The Queen Mary Hotel · May 16-20, 2011





**() Brother,  
Where  
Art  
Thou?**

## **A Case of Familial Identity**

**By Pamela Hofsass**

In November of 2005, what began as a simple verbal agreement for sexual favors for a predetermined sum of money turned into a twisted night of terror in the cities of San Francisco and Hayward for two women visiting from Kansas. These women, decided to “set up shop” on Van Ness Boulevard in San Francisco. On the night in question, they accepted a ride from Marvin Galdemez in his Ford Contour and headed toward Fisherman’s Wharf with the intent of providing the agreed upon service in an empty parking lot. Once the engine was turned off, Marvin jumped out of the driver’s seat and suddenly the second assailant, Dustin Flatt, popped out of the Ford’s trunk. This second assailant known to his friends as “Big Diesel” stood 6’2” and weighed 350 lbs. Unbeknownst to the victims, these assailants had been wreaking havoc in San Francisco for the last few months.

Both Marvin and Dustin proceeded to strike the women repeatedly and sexually attack them in the front and back seats of the Ford. They robbed the women of their cellular phones, purses, and large sums of cash. With their new found wealth, Marvin and Dustin were reported to have exclaimed: “Hey, big money, we’re going to a motel now to celebrate!” Things turned for the worse as both women were blindfolded and driven to an undisclosed motel in the East Bay (later determined to be in Hayward, CA). While driving to the motel, the victims overheard the assailants making calls on the stolen cell phones, saying: “Hey, we got some bitches here. Come on and party with us.”

According to the preliminary testimonies of both victims, while heading to the motel, Marvin made a pit stop at an unknown location and picked up a third assailant. The assailants, now numbering three, and the two victims then drove to a Motel 6 in Hayward, CA. At the motel, the “party” continued and both victims were repeatedly raped, sodomized and forced to orally copulate all three assailants. After the attacks, Marvin and Dustin demanded jewelry and more cash from the victims. Finally, the victims were driven to a remote industrial area and forced to take off their shoes and underwear. The victims were ordered to turn over their ID cards to the assailants. Since this all occurred next to a dumpster, one can only imagine the terror that these two women experienced while standing outside in the cold and dark. Luckily for the victims, the three assailants drove off and a Good Samaritan stopped and transported them to a location in South San Francisco where the police were called.

The San Francisco Police Department took over the case but could not locate either the motel or the vehicle where the crimes were committed. However, both victims agreed to provide evidence in the form of sexual assault kits [SAEKs].

The original Sexual Assault Unit Inspector assigned to this case was able to glean critical information through search warrants on the victim’s cell phones (the phones that were stolen and used by the assailants.) Through the cellular phone records and some great follow-up work, the Inspector was able to determine the identities of the first two assailants: Marvin Galdemez and Dustin Flatt. The victims positively identified both assailants from photo arrays and arrest warrants were promptly issued.

---

*The author is an inspector in the homicide detail of the San Francisco Police Department. This paper was given at the Fall 2009 CAC Seminar, and won the “Al Biasotti Most Outstanding Presentation” award.*



**"A detective's job does not end with the lab report and a DNA match."**



Figure 1. Key pieces of evidence from the SAEK of VICTIM #1 (Item 1D: hair matted with seminal fluid) and VICTIM #2 (Item 2H: a "used" condom removed from the VICTIM's vaginal cavity)

Meanwhile, back at the lab, Criminalist Bonnie Cheng was able to develop several DNA profiles from numerous pieces of evidence which included a neck swab and matted hair samples. Cheng was also able to develop foreign DNA from the inside and outside of the "used" condom (see Figure 1) and from the vaginal swabs from VICTIM#2. In 2006, the SFPD Crime Lab reported a match between saliva evidence detected on the neck swab and the reference DNA of Marvin Galdemez. In addition, semen detected on the matted hair sample matched the reference DNA of Dustin Flatt. A third male profile was detected in the sperm fraction of the condom and both Galdemez and Flatt were eliminated as a source of

this profile. This same male profile was detected on the vaginal swabs as well. The Lab report referred to this profile as "unknown male I" but did not offer any further conclusions.

In April of 2007, during a Preliminary Hearing, the victims referred to a third assailant throughout their testimony. They described this third assailant as possibly related to Dustin Flatt and provided details of his physical description. The Assistant District Attorney assigned to the case requested assistance from the Sexual Assault Unit in order to determine the identity of this third assailant. Since the initially assigned Inspector had retired and I had training and experience in DNA analysis, the case was re-assigned to me. My plan was to follow-up on the information provided at the preliminary hearing, review the DNA results and attempt to identify the third assailant.

After a review of the Sexual Assault case file, DNA laboratory reports and court transcripts, I began to strongly consider the younger brother of Dustin "Big Diesel" Flatt for the 3rd assailant. In examining the Crime Lab's DNA report, I noted a striking resemblance of the "unknown male profile I" from the sperm fraction detected on the used condom to Dustin Flatt's known reference DNA profile. I took the Genetic Summary Tables from the DNA Crime Lab Report and laid the reference DNA profile of Dustin Flatt directly alongside the profile detected on "side A" of the used condom. Specifically I noticed matching loci at seven out of thirteen markers and six shared alleles at the remaining loci. (Fig 2.)

After double-checking my comparisons, I rushed to my lieutenant's office and explained that based upon the corresponding matched and shared alleles, the evidence supported the theory that the third assailant was a blood relative and likely a full sibling. My next task would be to follow-up on the Flatt family tree and determine if Dustin did in fact have a younger brother. A few phone calls to Hayward PD along with computer queries revealed prior police contacts between Dustin and his younger brother, Matthew Flatt as well as prior police incidents where all three individuals, Marvin, Dustin and Matthew were involved. I presented my theory to the DA's office and was given the green-light to locate the younger brother and obtain a search warrant for his DNA reference sample. The only hitch was finding out little brother's whereabouts...

Initial computer queries placed Matthew Flatt in Hawaii where he was purportedly staying with his biological father. Shortly after making plans for a westbound trip, I found out (with help from Hawaii 5-0) that he had enlisted in the Armed Forces in April of 2006. After numerous phone calls, I determined that Matthew Flatt was stationed at Camp LeJeune in North Carolina—he was a Marine.

In North Carolina, I received great assistance from NCIS Special Agent Bouzoukis – he set me up with an audio/video interview room, arranged for Private Flatt's escort to the NCIS office, arranged for a tour of Camp LeJeune and arranged for accommodations at the Officer's Quarters. During my interview, Private Flatt could "not recall" his whereabouts in November of 2005, repeatedly denied any involvement with the crime and provided a DNA reference sample to clear his name.

Upon my return from North Carolina, the SFPD Crime Lab worked up Matthew Flatt's reference sample and matched it to the "unknown male Profile I" detected on the used condom to (Fig. 4). Armed with the Supplemental Lab report and additional facts, I obtained an arrest warrant for Matthew Flatt. Once the warrant was entered into the system, our fugi-

## U Brother, cont'd

tive recovery team traveled across the country to escort him to our county jail.

A detective's job does not end with the lab report and a DNA match. This quasi-cold case required extensive follow-up based on the fact that the incident involved two out-of-state victims and three defendants. In short, trial was averted and the two "main" assailants pled to rape in concert, robbery and aggravated assault. Marvin Galdemez and Dustin Flatt are each serving ten years in State Prison and upon serving their time will face violent offender hearings. Matthew Flatt pled to rape in concert, served two years in State Prison and must register as a sex offender. He will not be returning to the Armed Services.

Thanks to this case, our crime lab's DNA unit now scrutinizes "unknown profile" results for potential familial matches when similar situations present themselves (i.e. multiple suspects, possibly related). In addition, this case underscores the need for greater communication between the analysts and the detectives. Perhaps, Matthew Flatt would have been arrested a couple of years earlier had an exchange of theories as to the identity of that third unknown profile. As far as I know, this is one of a relatively (no pun intended) small cadre of familial matching cases that occurred without the benefit of CODIS.

**Table of Results  
AmpFISTR Profiler Plus**

ITEM	D3S1358	vWA	FGA	AMEL	D8S1179	D21S11	D18S51	D5S818	D13S317	D7S820
#2H-1 Condom side A, non-sperm fraction §†	14,15>17	17,17>14	22,22>20,28	X,X>Y	12,14	26,30>28	15,17>13	12,13>11	11,11>9,12	10,11>12
#2H-1 Condom side A, sperm fraction §	15,17	14,17	20,28	X,Y	11,14	28,30	13,13	11,11	9,12	11,12
#8-1 D. Flatt Oral reference	15,15	16,17	23,28	X,Y	11,14	28,29	13,13	11,11	12,12	11,12

Figure 2. Genetic Summary Table with the focus on the sperm fraction of condom, side A versus the known DNA reference sample from Dustin Flatt. Note: only Profiler Plus results displayed, COfiler results included three additional loci matches.



"...our crime lab's DNA unit now scrutinizes 'unknown profile' results for potential familial matches when similar situations present themselves..."

Figure 3. Inspector Pam Hofsass with Chief James Reed and Special Agent Scott Bouzoukis from NCIS—Jacksonville, N.C.

#2H-1 Condom side A, non-sperm fraction §†	14,15>17	17,17>14	22,22>20,28	X,X>Y	12,14	26,30>28	15,17>13	12,13>11	11,11>9,12	10,11>12
#2H-1 Condom side A, sperm fraction §	15,17	14,17	20,28	X,Y	11,14	28,30	13,13	11,11	9,12	11,12
#8-1 D. Flatt oral reference §	15,15	16,17	23,28	X,Y	11,14	28,29	13,13	11,11	12,12	11,12
#9A M. Flatt Oral reference	15,17	14,17	20,28	X,Y	11,14	28,30	13,13	11,11	9,12	11,12

Figure 4. Profile Plus data with Condom side A and M. Flatt reference (Item 9A)

# CROSSWORD PUZZLE

by John Houde

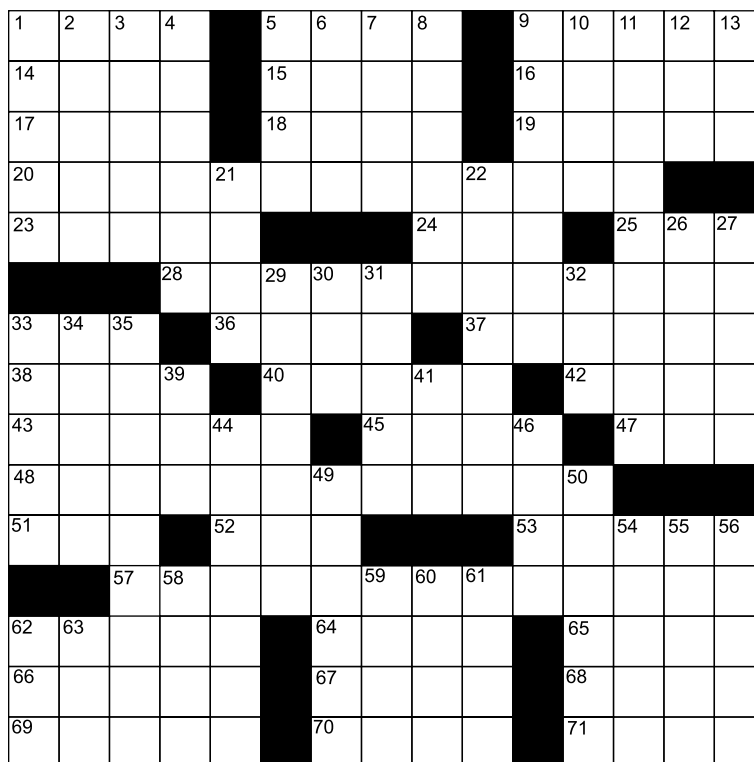
## "Forensic Leanings"

### ACROSS

- 1 Fuse spec.
- 5 Took off
- 9 The "B" in B.I.D. (Rx shorthand)
- 14 Medieval protection
- 15 -acious prefix
- 16 Poisonous castor bean extract
- 17 Latin subj. line
- 18 Which way \_\_\_\_\_?
- 19 From history
- 20 What some psychedelic mushrooms do
- 23 DNA form
- 24 "Energy Star" co-agcy.
- 25 Sum of Descartes
- 28 Contraband often found as pastes
- 33 Forens. grp. founded in 1954
- 36 Standard
- 37 One of two or more forms of a molecule
- 38 Types of people
- 40 Vision
- 42 Bissextile year
- 43 Chock full o' knots
- 45 Ms. Peeples and others
- 47 Questionnaire boxes (abbr)
- 48 Rueful through-and-through
- 51 Calif. grant source
- 52 Poetic dusk
- 53 Shoulder arm
- 57 Script for an old TV show, or a way out of jail?
- 62 Insurance filing
- 64 Orbison hit "\_\_\_\_\_ the Lonely"
- 65 If-Then-\_\_\_\_\_ (programming branch)
- 66 Whiff
- 67 Group-owned apt., maybe
- 68 Western US mtn. range
- 69 Signed the deal
- 70 *Star Wars* sea monster
- 71 Slower than a canter

### DOWN

- 1 Some Plain people
- 2 Three-card \_\_\_\_\_ (scam)
- 3 \_\_\_\_\_ Evidence Rule (contracts)
- 4 It can be a hindrance
- 5 Go nuts (for)
- 6 Disappearance
- 7 Prefix for the same
- 8 Back-to-back
- 9 Pointed medical tools





# Alameda Scrapbook

DIGITAL AND MULTIMEDIA FORENSICS



FIRE DEATH INVESTIGATION



FORENSIC PHOTOGRAPHY



## FEATURED WORKSHOPS



ETHICS FOR THE FORENSIC SCIENTIST



DNA

The theme for the Fall 2010 meeting of the CAC was *"Unearthing the Truth."* The truth was, the Alameda County sheriff's criminalistics lab did an outstanding job of putting together a meeting rich with workshops, technical presentations and the latest technology on display at the vendor booths. Seminar Chair Ann Keeler and her staff (Penny Ritter, Heidi Bates, Kristi Lanzisera, Jessica Kaut, Christine Lee, Guillermo Calica, Riad Cherifi and Cary Wong) each had to wear many hats as they provided a comfortable space for us to meet with friends and colleagues.

The banquet menu included an appetizer of CAC award presentations followed by a dessert of dancing until late.

If you missed this meeting, you missed a good one; consider not missing the next. (See the back cover if you need inspiration).





## Alameda Scrapbook

*Alameda Co. Sheriff Gregory Ahern welcomes the CAC and Ann Keeler welcomes the sheriff.*





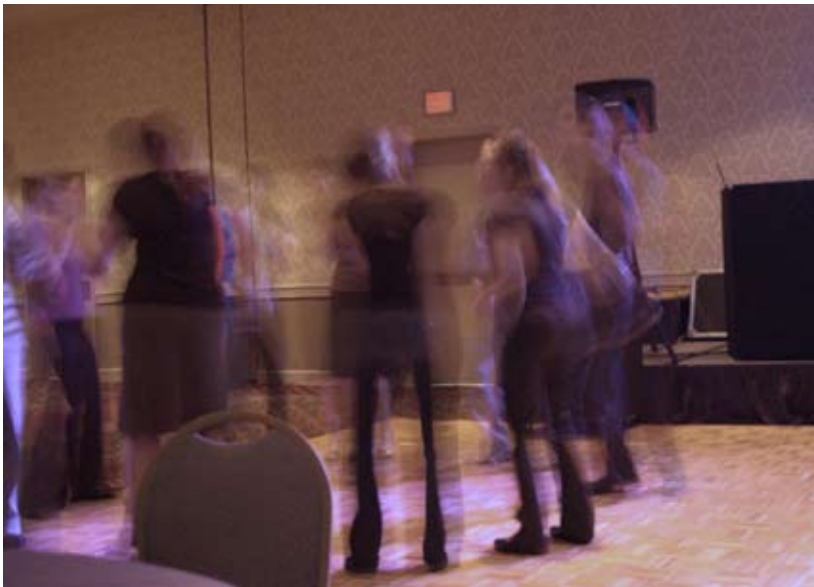






Bob Blackledge shares a cuppa with guest speaker, author Michael Hemp (r).





*Alameda Fall 2010 Hosts!*





# Alameda Scrapbook

*Your 2010-11 CAC Board of Directors keeping the organization running smoothly...*





# Ethical Dilemmas

DISCUSSION CORNER WITH CAROLYN GANNETT

This is the first in a series of articles that will examine ethical dilemmas in criminalistics. The scenarios presented here may be real events, adaptations from real events, or fabrications designed to illustrate a point. If you have an ethical dilemma that you would like to have discussed (real, fabricated, or somewhere in between), you may submit a sanitized version to the author for consideration; send it to GannettForensics@aol.com. Ethical dilemmas will be evaluated against the content of over twenty associations' guidelines for professional conduct. Each association has a different document, although there may be considerable overlapping content. Often the ideas expressed in these guidelines are open to interpretation. The views expressed here are those of the author.

**Readers are encouraged to contribute their own views in an open discussion on the CAC website—go to <http://ethicsforum.cacnews.org>**

## The Scenario: Succinct, Honest Testimony

As a supervisor, it is your responsibility to periodically evaluate your employees' testimony. While watching one of your employees testify, you observed that he precisely and succinctly answered each question put to him. However, the questions posed by the attorneys were phrased in such a way that pertinent testimony was not heard by the jury. When you pointed this out to your employee, his response was that he listened carefully to what was being asked and answered everything honestly and completely without adding information not asked for. He added that it's not his problem if the attorneys don't know what to ask.

## Discussion

In court testimony classes, criminalists are typically taught to do precisely what this employee did: listen carefully to the question and answer only what has been asked. Yet, this may be in conflict with concepts found in some codes of ethics.

### **Fully explain results and conclusions, including qualifications and limitations.**

One of these concepts is: fully explain results and conclusions, including qualifications and limitations. This idea is expressed in the codes of ethics from AFTE\* (twice), ANZFSS\*, ASCLD/LAB\*, CAC\* (twice), and NWAFS\*\* (twice). In their codes, under sections on court presentation, the following can be found:

*AFTE III.J, CAC III.E, and NWAFS III.E: ...Where an opinion requires qualification or explanation, it is not only proper but incumbent upon the witness to offer such qualifications.*

In other words, it may not always be ethical to merely answer the question put forth. According to these associations, it is incumbent upon the witness to offer any required qualifications or explanations, regardless of whether such qualifications or explanations are explicitly requested.

Although the following are found in sections on reporting (rather than sections on court presentation), they also convey the principle of fully explaining results and conclusions.

*AFTE II.C CAC II.E, and NWAFS II.E: Where test results are inconclusive or indefinite, any conclusions drawn shall be fully explained.*

*ANZFSS - Reporting, 1: ...Any pertinent limitations to the test results and conclusions should be explained.*

*ASCLD/LAB 15: ...Reports are prepared in which facts, opinions and interpretations are clearly distinguishable, and which clearly describe limitations on the methods, interpretations and opinions presented.*

### **Take appropriate action if you believe there could be a miscarriage of justice.**

Another applicable concept is: take appropriate action if you believe there could be a miscarriage of justice. This is expressed in four associations' guidelines: ABC\*, ANZFSS\*, ASCLD/LAB\*, and ENFSI\*. Quotes that directly apply to the scenario include the following:

*ABC Rule 13: Make efforts to inform the court of the nature and implications of pertinent evidence if reasonably assured that this information will not be disclosed to the court.*

*ANZFSS Conduct in Court, 6: The witness should appeal to presiding judicial officer (in the absence of the jury if the trial be by judge and jury) if they believe that the manner in which evidence is being elicited is such to prevent the disclosure of a significant relevant matter or circumstance.*

In short, if a witness has not been asked questions in court that allowed pertinent evidence to be presented, the witness should try to inform the court. Other quotes that are related include the following:

*ASCLD/LAB 5: Laboratory management will take appropriate action if there is potential for, or there has been, a miscarriage of justice due to circumstances that have come to light, incompetent practice or malpractice.*

*ENFSI 2.17: Take appropriate action if you have good grounds for believing there is a situation which could result in a miscarriage of justice.*

In this scenario, it appears that ASCLD/LAB would explicitly place responsibility on the observing supervisor if the employee's succinct testimony could result in a miscarriage of justice. Appropriate action might involve following through in accordance with ABC's and ANZFSS's guidelines (attempting to inform the court), retraining the employee to act in accordance with AFTE's, CAC's and NWAFS's codes (to offer quali-

*please turn to page 32*

# Fresno Laboratory Alcohol Correlation Study

Greg Masters and Maria Woodcock

## Abstract

On April 20, 2010, an alcohol correlation study was conducted at the California Association of Criminalists 2010 Spring Seminar at the Tenaya Lodge in Yosemite. The goals of the study were:

- To correlate the alcohol concentration of different sample types to one another
- To correlate alcohol concentration to observable symptoms of test subjects
- To correlate alcohol concentration to the drinking pattern of test subjects
- To correlate the alcohol concentration observed to the test subjects' hypothetical Widmark Estimate
- To calculate the test subjects' elimination rate.

## Procedure

Six subjects were given measured volumes of alcohol to raise their blood alcohol concentration (BAC) to approximately 0.10% (W/V) given instantaneous absorption of the alcohol. To achieve the desired BAC peak and determine the amount of alcohol that would be given to the subjects, the following Widmark equation was used:

$$\text{GRAMS ETHANOL CONSUMED} = \text{SUBJECTS WEIGHT IN GRAMS} \times \text{WIDMARK FACTOR} \times \text{TARGET BAC}$$

A Widmark factor of 0.56 was used for the four female drinkers and a Widmark factor of 0.68 was used for the two male drinkers.

The subjects' weight was measured the day of the study using a standard bathroom scale and the alcohol was measured using a 100 mL graduated cylinder. All subjects were asked to finish eating breakfast prior to 7:00 AM, approximately two hours before drinking commenced and all drinking was to be finished within one hour.

Breath alcohol concentration (BrAC) was measured using the screening mode of a Draeger Alcotest 7410+<sup>1</sup> Evidential Portable Alcohol System (EPAS) unit. Additionally, BrAC was also measured using the screening mode of a Draeger Alcotest 7510<sup>1</sup> EPAS unit that is currently being validated by the California Department of Justice (DOJ), Bureau of Forensic Services (BFS). The 7510 will be distributed for use throughout California later this year and at the beginning of next year. Blood was drawn from each subject by a licensed phlebotomist and was collected into 10 mL Vacutainer<sup>®</sup> tubes containing 100 mg of sodium fluoride (NaF) and 20 mg of potassium oxalate. Urine was collected into 100 mL sample containers containing 100 mg of NaF. To further correlate different methods of testing, a single breath sample was measured using an Alcosensor IV<sup>1</sup> breath testing instrument on three of the subjects.

In order to observe the effects of alcohol at different blood alcohol concentrations, controlled tests or activities were performed by the subjects throughout the study. Subjects were asked to perform field sobriety tests (FSTs) that were administered by two qualified Fresno CHP officers.

They were also asked to trace through a single-path maze that contained varying path sizes while being timed. A single maze was created and in an attempt to ensure that the subjects did not memorize it, the maze was mirrored below, mirrored to the side, and rotated 180 degrees to create four similar but different tests. Lastly, the subjects were asked to take one minute typing tests using the typing software "Typing-Master Typing Test<sup>®</sup>." This software has an assortment of pre-loaded texts to choose from and measures words per minute (WPM), accuracy, and the product of those (net WPM). After completing the typing test a first time, a passage was read to the subjects as they performed the exercise a second time in an attempt to simulate divided attention. A baseline was measured for each task prior to when drinking started. To ensure that the subjects' behavior was not affected by knowledge of their BAC, the results of the breath tests were not disclosed to the subjects. Each subject was assigned two handlers to ensure his or her safety as well as to make notations of any significant behaviors or actions during the course of the study.

## Analysis

Blood and urine samples were analyzed using a headspace gas chromatograph coupled with a flame ionization detector (FID). Samples were run on an Agilent G1888 semi-automated headspace sampler coupled with an Agilent 6850 gas chromatograph containing a J&W DB-ALC1 30 m x 0.53 mm I.D. column. All samples were analyzed in duplicate following the California DOJ BFS Blood Alcohol Technical Procedures which have been approved by the California Department of Public Health and are in compliance with Title 17 of the *California Code of Regulations*.

## Results

The following pages contain a summary of pertinent subject information as well as tables and graphs of the data from the activities performed. Results from the tracing test demonstrate the length of time it took to complete the maze and the number of mistakes that were made. Mistakes are defined as touching the maze path lines, pausing long enough to leave a noticeable mark, and lifting the pen from the paper. Results from the typing tests are also depicted to show WPM and accuracy. Lastly, a table and graph detail the breath, urine, and blood alcohol concentrations that were measured throughout the day. The highlighted alcohol concentrations in the 'alcohol curve' table are the points used to determine the alcohol burnoff rate. All charts are plotted on the same time axis to allow for easy comparison.

## Discussion

### *Correlation of Different Sample Types:*

By comparing the alcohol concentration curves to one another, it is apparent that they correlate relatively close to one another; the exception being the curve for urine samples. Although all subjects voided their bladder between 8:00 AM and 9:00 AM, they did not void their bladder 20 minutes prior to producing the first urine sample with alcohol in it, approximately two hours after the initial void. Had a proper void been

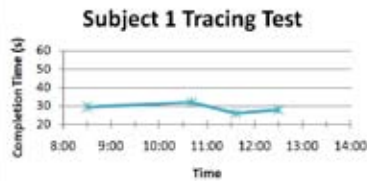
---

<sup>1</sup> All breath alcohol instruments used are included on the National Highway Traffic Safety Administration (NHTSA) conforming products of evidential breath alcohol measurement devices.



Subject 1 Info	
Weight:	126 lbs
Age:	45
Sex:	Female
Drinker Classification:	Moderate/Light Drinker
Alcohol:	80 Proof vodka
Quantity:	100 mL
Drinking Started:	8:51 AM
Drinking Finished:	9:41 AM
Total Time:	50 minutes

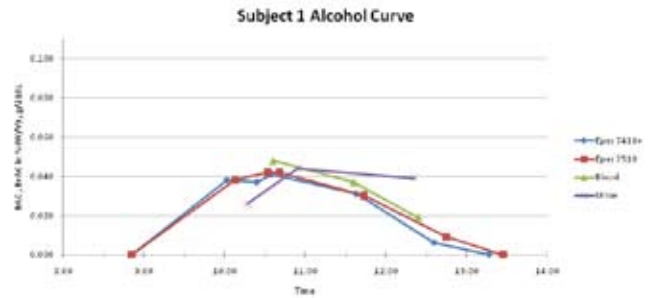
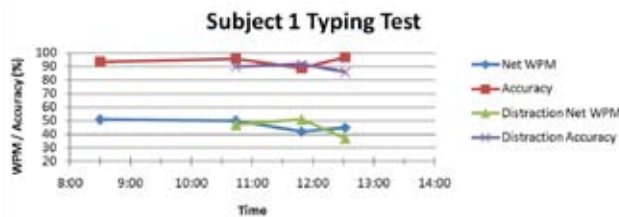
Subject 1 Tracing Test		
Time:	Completion Time (sec):	Mistakes:
8:30 (Baseline)	29.56	10
10:41	32	10
11:36	26	9
12:30	28	9



Subject 1 Alcohol Curve			
Time	7410+	Time	7510
8:51	0.000	8:51	0.000
10:02	0.018	10:08	0.018
10:34	0.037	10:32	0.042
10:35	0.041	10:41	0.042
11:38	0.031	11:44	0.030
12:36	0.006	12:45	0.009
13:17	0.000	13:27	0.000

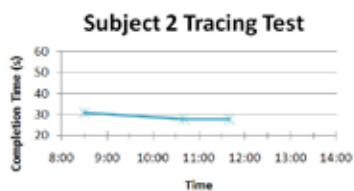
Subject 1 Burnoff (g/dl/h)	
7410+ Burnoff:	0.01636
7510 Burnoff:	0.01500
Blood Burnoff:	0.01590
Average Burnoff:	0.01580

Time:	Normal			With Distractions		
	WPM	Accuracy (%)	Net WPM	WPM	Accuracy (%)	Net WPM
8:30 (Baseline)	54.5	93.5	51	-	-	-
10:44	52	96	50	52	90	47
11:49	47	89	42	55	92	51
12:32	46	97	45	43	86	37



Subject 2 Info	
Weight:	144
Age:	41
Sex:	Female
Drinker Classification:	Moderate Drinker
Alcohol Consumed:	80 Proof Vodka
Quantity:	117 mL
Drinking Started:	8:51 AM
Drinking Finished:	9:46 AM
Total Time:	55 minutes

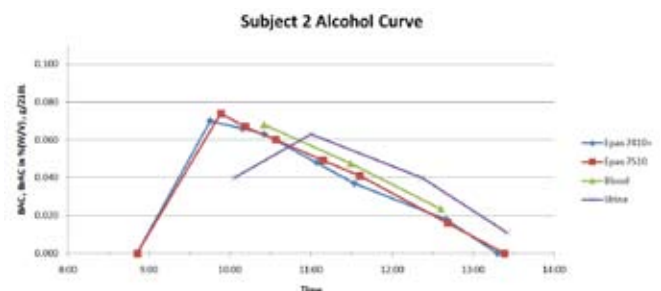
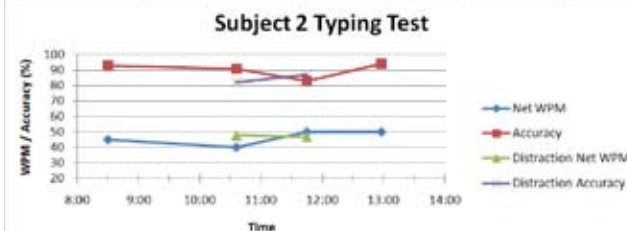
Subject 2 Tracing Test		
Time:	Completion Time (sec):	Mistakes:
8:30 (Baseline)	31	12
10:40	28	13
11:40	28	13



Subject 2 Alcohol Curve			
Time	7410+	Time	7510
8:51	0.000	8:51	0.000
9:45	0.076	9:53	0.074
10:09	0.066	10:13	0.0475
10:25	0.065	10:34	0.060
11:04	0.048	11:09	0.048
11:12	0.037	11:36	0.041
12:40	0.018	12:41	0.016
13:18	0.000	13:23	0.000

Subject 2 Burnoff (g/dl/h)	
7410+ Burnoff:	0.03993
7510 Burnoff:	0.03091
Blood Burnoff:	0.02040
Urine Burnoff:	0.02129
Average Burnoff:	0.02560

Time:	Normal			With Distractions		
	WPM	Accuracy (%)	Net WPM	WPM	Accuracy (%)	Net WPM
8:30 (Baseline)	48	93	45	-	-	-
10:36	44	91	40	58	82	48
11:45	60	83	50	54	87	47
12:58	53	94	50	-	-	-



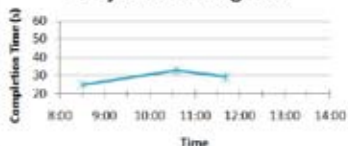
## Alcohol Correlation Study, cont'd

Subject 3 Info	
Weight:	170
Age:	44
Sex:	Female
Drinker Classification:	Moderate Drinker
Alcohol Consumed:	80 Proof Vodka
Quantity:	119 mL
Drinking Started:	8:54 AM
Drinking Finished:	9:44 AM
Total Time:	50 minutes

Subject 3 Tracing Test

Time:	Completion Time (sec):	Mistakes
8:30 (Baseline)	25	9
10:35	32.67	11
11:42	29.39	15

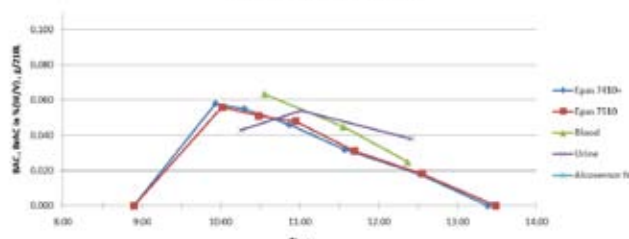
Subject 3 Tracing Test



Subject 3 Alcohol Curve	
Time	BAC
8:54	0.000
9:56	0.058
10:18	0.055
10:52	0.046
11:34	0.041
12:31	0.018
13:28	0.000
Time	BAC
8:54	0.000
10:31	0.0635
11:33	0.043
12:27	0.025
Time	BAC
10:15	0.043
11:02	0.054
12:25	0.038
Time	BAC
11:30	0.041

Subject 3 Burnoff (g/dl/h)	
7430 Burnoff:	0.01701
7510 Burnoff:	0.01651
Blood Burnoff:	0.02110
Average Burnoff:	0.01820

Subject 3 Alcohol Curve

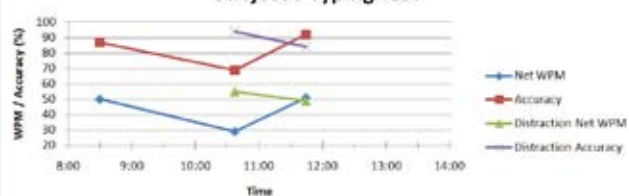


Note: This subject did not consume the correct amount of alcohol to reach the calculated 0.10% (W/V) BAC. Given the amount of alcohol consumed and the Widmark factor used, this subject should have peaked at 0.0878% (W/V) given instantaneous absorption.

Subject 3 Typing Test

Subject 3 Typing Test	
Normal	
Time:	WPM
8:30 (Baseline)	57
10:37	42
11:44	55
With Distractions	
Time:	WPM
8:30 (Baseline)	50
10:37	29
11:44	51

Subject 3 Typing Test



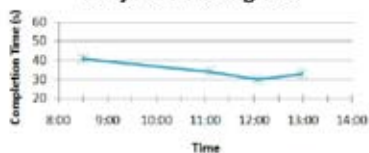
Subject 4 Info

Weight:	175
Age:	32
Sex:	Female
Drinker Classification:	Moderate/Light drinker
Alcohol Consumed:	80 Proof Vodka
Quantity:	139 mL
Drinking Started:	8:57 AM
Drinking Finished:	9:24 AM
Total Time:	27 minutes

Subject 4 Tracing Test

Time:	Completion Time (sec):	Mistakes
8:30 (Baseline)	41	9
11:06	34	12
12:05	30	13
12:59	33	11

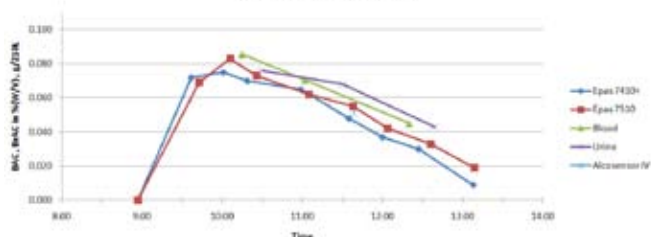
Subject 4 Tracing Test



Subject 4 Alcohol Curve	
Time	BAC
8:57	0.000
9:37	0.072
10:01	0.075
10:19	0.070
10:50	0.068
11:35	0.048
12:00	0.037
12:37	0.030
13:08	0.009
Time	BAC
8:57	0.000
10:13	0.0855
11:02	0.0726
12:00	0.043
Time	BAC
10:10	0.078
11:30	0.064
12:38	0.043
Time	BAC
11:38	0.051

Subject 4 Burnoff (g/dl/h)	
7430 Burnoff:	0.02065
7510 Burnoff:	0.02012
Blood Burnoff:	0.01948
Urine Burnoff:	0.02174
Average Burnoff:	0.02060

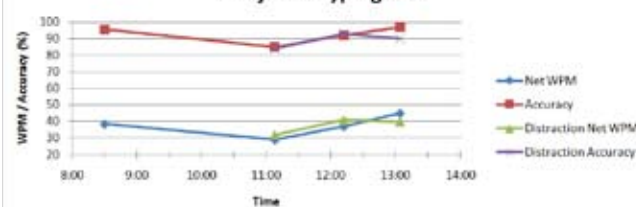
Subject 4 Alcohol Curve



Subject 4 Typing Test

Subject 4 Typing Test	
Normal	
Time:	WPM
8:30 (Baseline)	40
11:08	34
12:12	40
13:04	46
With Distractions	
Time:	WPM
8:30 (Baseline)	38.5
11:08	29
12:12	37
13:04	45

Subject 4 Typing Test

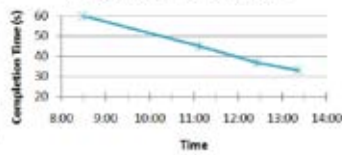


Subject 6 Info	
Weight:	225
Age:	43
Sex:	Male
Drinker Classification:	Light Drinker
Alcohol Consumed:	80 Proof Tequila, imported beer (approx 4.8% V/V)
Quantity:	174 mL tequila, one 12 oz. beer
Drinking Started:	8:56 AM
Drinking Finished:	9:55 AM
Total Time:	59 minutes

Subject 6 Tracing Test

Time:	Completion Time (sec):	Mistakes
8:30 (Baseline)	60	5
11:07	45	11
12:25	37	7
13:22	33	8

Subject 6 Tracing Test



Subject 6 Alcohol Curve

Time	7410+	Time	7510	Time	Blood	Time	Urine	Time	Alcohol in IV
8:56	0.000	8:56	0.000	10:27	0.102	10:30	0.070	11:15	0.074
10:14	0.087	10:21	0.100	11:37	0.082	11:30	0.090		
10:46	0.085	10:47	0.085	12:32	0.064	12:32	0.072		
11:43	0.068	11:48	0.067			13:34	0.047		
12:47	0.082	12:49	0.095						
12:51	0.051	12:58	0.054						
13:45	0.031	13:46	0.042						

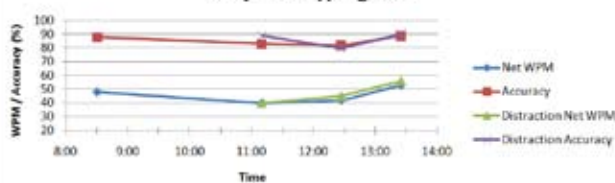
Subject 6 Burnoff (g/dl/h)

7410+ Burnoff:	0.01806
7510 Burnoff:	0.01816
Blood Burnoff:	0.01820
Urine Burnoff:	0.02081
Average Burnoff:	0.01832

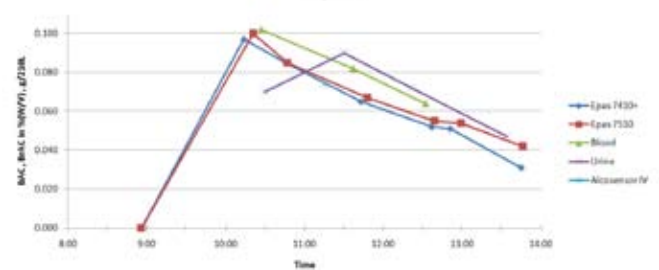
Subject 6 Typing Test

Time:	Normal			With Distractions		
	WPM	Accuracy (%)	Net WPM	WPM	Accuracy (%)	Net WPM
8:30 (Baseline)	54.5	88	48	-	-	-
11:10	48	83	40	45	89	40
12:27	51	82	42	56	80	45
13:25	59	89	53	62	90	56

Subject 6 Typing Test



Subject 6



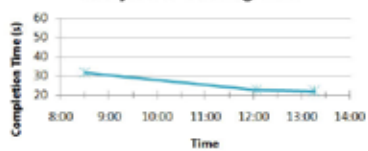
Subject 7 Info

Weight:	181
Age:	36
Sex:	Male
Drinker Classification:	Light Drinker
Alcohol Consumed:	80 Proof Tequila
Quantity:	174 mL
Drinking Started:	8:57 AM
Drinking Finished:	9:38 AM
Total Time:	41 minutes

Subject 7 Tracing Test

Time:	Completion Time (sec):	Mistakes
8:30 (Baseline)	31.53	Due to the tracing tests not being labeled, unknown # of mistakes were made.
12:04	22.63	
13:16	22	

Subject 7 Tracing Test



Subject 7 Alcohol Curve

Time	7410+	Time	7510	Time	Blood	Time	Urine
8:57	0.000	8:57	0.000	10:48	0.099	10:50	0.073
9:37	0.061	9:40	0.067	11:10	0.092	11:27	0.075
10:01	0.060	10:04	0.077	11:36	0.025	12:16	0.058
10:31	0.075	10:36	0.082	11:50	0.014	12:33	0.060
11:30	0.059	11:07	0.079				
12:04	0.047	11:40	0.061				
12:51	0.027	12:06	0.055				
13:32	0.020	12:43	0.043				

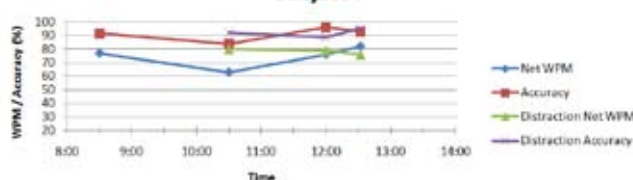
Subject 7 Burnoff (g/dl/h)

7410+ Burnoff:	0.01920
7510 Burnoff:	0.01982
Blood Burnoff:	0.02143
Urine Burnoff:	0.02063
Average Burnoff:	0.02030

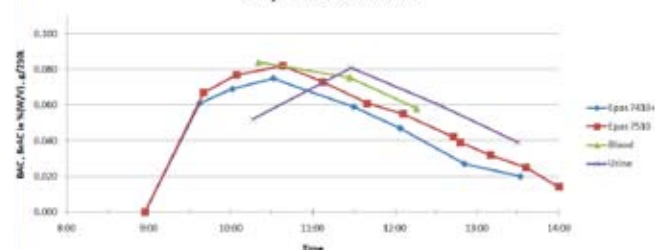
Subject 7 Typing Test

Time:	Normal			With Distractions		
	WPM	Accuracy (%)	Net WPM	WPM	Accuracy (%)	Net WPM
8:30 (Baseline)	83	91.5	77	-	-	-
10:30	75	84	63	86	92	80
12:00	79	96	76	88	89	79
12:32	88	93	82	80	95	76

Subject 7



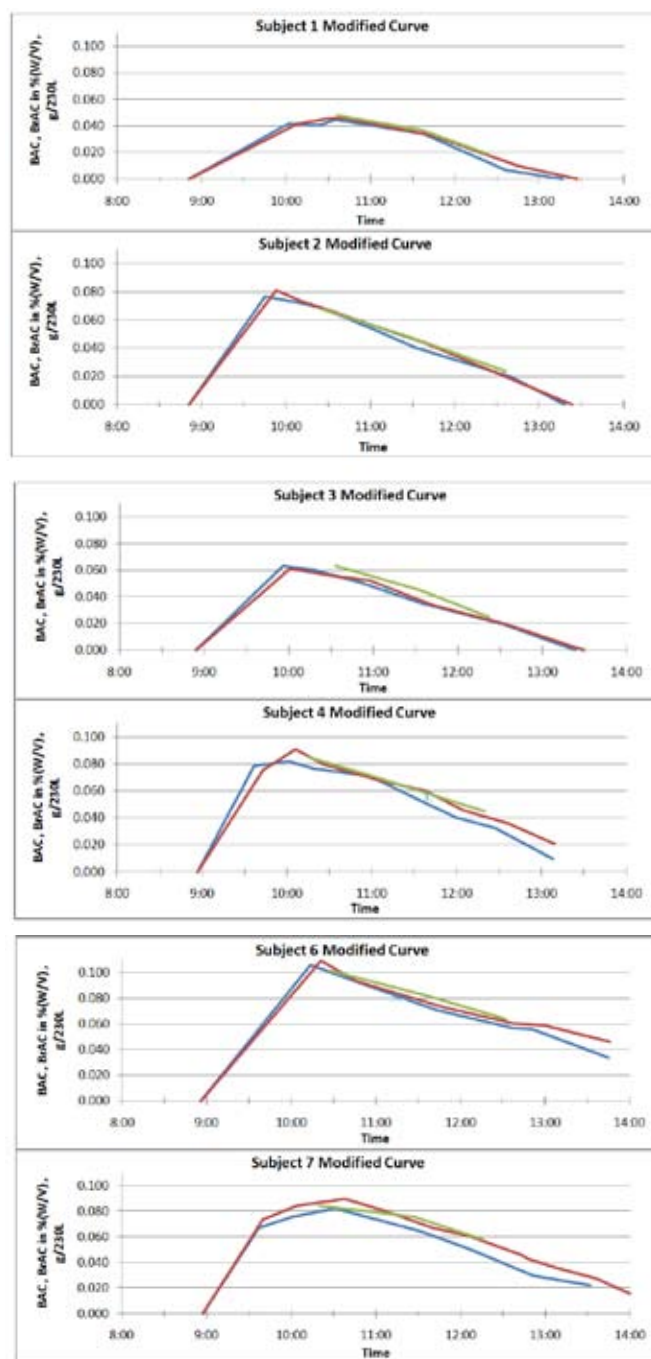
Subject 7 Alcohol Curve





## Alcohol Correlation Study, cont'd

performed and a greater number of samples been collected, it is likely that the urine curve would have correlated more closely to the other curves. The breath and blood samples correlate very closely to one another even when using the Title 17 mandated blood: breath partition ratio of 2100:1. When a partition ratio of 2300:1 (the ratio commonly cited in scientific journals as being more accurate) is used, they almost uniformly coincide with the blood curve as shown in the modified graphs below:



\*Data markers and legends were removed from the above graphs to more clearly compare the curves.

## Correlation of Alcohol Concentration to Observable Symptoms:

### FST's

Most subjects displayed little overt symptoms of alcohol impairment. All subjects became more talkative after drinking finished. In addition to becoming more talkative, Subjects 2, 3, and 4 became more easily distracted. Subject 4 developed a slight slur and increased her use of curse words, while Subject 6 became much more jovial and joking, and Subject 7 developed a slight sway and became slightly more lethargic. The symptoms displayed by the subjects do correlate to common behaviors found at lower and mid level BACs. All of the noticeable symptoms listed above had vanished from the subjects by approximately 11:00 AM to 11:30 AM, about an hour and a half to two hours after drinking finished.

During the first set of FSTs performed between 10:30 AM and 11:00 AM when subjects were near their peak BAC, the officers noted that all subjects displayed symptoms of alcohol impairment. However, only Subject 6 displayed enough symptoms to warrant an arrest. During these FSTs, all subjects with the exception of Subject 6 whose BAC was approximately 0.100% (W/V) at the time, were under the legal limit of 0.08% (W/V).

During the FSTs, the subjects were also asked whether they would feel comfortable driving (as stated in the procedure, the subjects were unaware of their BAC). Subject 1 felt comfortable driving throughout the entire study, but her peak BAC was only 0.048% (W/V). Subject 2 would not have driven until approximately 11:00 AM when her BAC was about 0.05% (W/V). Subject 3 was unsure of whether she would drive at 10:15 AM when her BAC was approximately 0.05% (W/V). She eventually decided that she would most likely drink water and wait awhile before driving. Subject 4 did not feel comfortable driving until 11:30 AM when her BAC was about 0.05% (W/V). Subject 6 considered being able to drive at 11:30 AM when his BAC was about 0.065% (W/V). Lastly, Subject 7 indicated that throughout the day, even at his peak BAC that was above 0.08% (W/V), he would feel comfortable driving. It is surprising that only Subject 7 demonstrated the typical impaired judgment of someone who is under the influence by his decision to drive at such a high BAC.

### Tracing Tests

The tracing tests were an excellent tool to compare alcohol concentration to observable symptoms. While intoxicated, the subjects would either complete the test slower than the baseline test while making a similar number of mistakes, or they would complete the test faster while making more mistakes. During Subject 1's 10:41 AM test, approximately one hour after drinking finished, not only was the completion time slower and the number of mistakes the same, one of the mistakes was of greater severity as she went out of the maze completely. Subject 2 demonstrated recklessness during her tracing tests. She completed them much faster making several more mistakes compared to her baseline. Additionally several of the mistakes were of greater severity. During Subject 3's tracing test at 10:35 AM, she attempted to take her time to stay within the lines of the path, but still ended up making more mistakes, several with greater severity. Approximately an hour later during Subject 3's 11:42 AM test, she went much faster, but in turn made many more mistakes (only one great error). During her first test her BAC was approximately 0.05%

(W/V) and it had dropped to approximately 0.03% (W/V) by the second test. Similarly, although Subject 4 completed the test faster throughout the day, she showed carelessness by making more mistakes as she rushed through the maze. At 12:05 PM when her BAC was about 0.04% (W/V) she made one large mistake and at 12:59 PM when her BAC was about 0.015% (W/V) she made three mistakes of greater severity. Unfortunately, with such a low BAC at 12:59 PM, she most likely was just doing the exercise to get it done. Subject 6 performed the test faster with each attempt, but the amount of mistakes he made, especially at 11:07 AM when his BAC was about 0.08% (W/V) and near his peak, increased substantially. In his last two tests he likely had become more comfortable with the test and had reached a low enough BAC to finish faster and make fewer mistakes. Only two tracing tests were collected while Subject 7 was under the influence of alcohol and neither was labeled with the time the test was taken. One test had nine errors and the other had ten. In addition, the time to complete the baseline test was recorded but the test itself was not retained, so the number of mistakes is unknown. He did finish the test significantly faster while under the influence though. Generally as the subjects' BAC dropped lower, they performed faster and/or made fewer mistakes showing that the alcohol impairment did affect their ability to perform the test.

### *Typing Tests*

Unfortunately, the typing test did not produce the expected results of higher BAC levels causing accuracy and WPM to decrease. Only with Subject 4 and Subject 6 did BAC inversely correlate to WPM and accuracy. However, the attempt at simulating divided attention by reading to the subjects as they typed did not work for either subject. The most likely reason that the typing test did not provide better data was because the subjects were asked to type different texts throughout the day. Originally, it was felt that if the same text was typed throughout the day, the subjects would begin to memorize the text and their BAC would have less of an effect on their performance. Because of the lack of correlation between BAC and typing performance, it is likely that the different texts typed by the subjects had different inherent difficulty (some contained a greater amount of punctuation or contained less common punctuation such as bracketing). Similarly, the performance from when the subjects were distracted most likely did not produce the expected findings because different texts were used. It should be noted that Subject 6, who did produce the expected results, typed the same text throughout the day.

### *Correlation of Alcohol Concentration to the Hypothetical Widmark Estimate and Drinking Pattern:*

Generally all of the subjects drank at a fairly constant rate with only slight increases or decreases in consumption rate near the end of their drinking. The measured alcohol concentrations were all fairly close to the calculated 0.10% (W/V) peak BAC when certain considerations were made. Subject 1, who was furthest from the desired peak BAC, had stated that although she had finished breakfast prior to 7:00 AM, she had consumed a very large breakfast. Despite the fact that two hours had passed before drinking started, she most likely still had food in her stomach that delayed alcohol absorption. This is most apparent in her BAC curve as there is no well defined peak and it plateaus at 0.04% (W/V) for more an hour. Also, it is likely that her Widmark factor is greater than 0.56 given

her lean build. Similarly, Subject 3 (who was also far from the estimated BAC) had stated that she finished breakfast by 7:00 AM, but had eaten a large breakfast. Although not as extreme as Subject 1, Subject 3's curve does plateau near 0.06% (W/V) for approximately 30 minutes. Combined with a 50 minute alcohol ingestion period, her 0.0182 g/dl/h elimination rate, and the improper administration of alcohol, Subject 3 was close to the calculated BAC.

Using the modified curves, Subject 2 and Subject 4 had peaked at slightly over 0.08% (W/V) and 0.09 % (W/V) respectively. When the drinking times of 55 minutes and 27 minutes are considered along with their elimination rates of approximately 0.0206 g/dl/h, the Widmark calculation fairly accurately estimated the target 0.10% (W/V) BAC.

Subject 6 had reached the highest BAC. Although his subject information indicates that drinking started at 8:54 AM and finished at 9:44 AM, it should be noted that he did not follow the typical drinking pattern of the other subjects. He drank straight tequila on the rocks and slowly drank it along with his beer. When reminded that he would need to finish drinking by 10:00 AM, he guzzled the remaining half of his drinks in just a couple of minutes. Given the quick ingestion of the most of his alcohol, the effect of alcohol elimination during consumption is reduced. Still, his BAC curve is slightly higher than predicted and is most likely due to his Widmark factor varying from the 0.68 factor that was used. Lastly, Subject 7 demonstrated a curve different from the other subjects. He reported eating no breakfast and had no liquids prior to when he started drinking, yet his curve shows a slow absorption of alcohol. He did not reach his peak BAC until an hour after drinking finished where as the other subjects peaked between ten minutes to 35 minutes after drinking finished. Literature states that a peak BAC will generally occur between 15 to 90 minutes or more after drinking is completed. Although most of the other subjects had reached their peak BAC much sooner, Subject 7 is clearly a much slower absorber of alcohol than the other subjects yet is still within the normal reported absorption rates.

### *Calculation of subjects' elimination rates:*

Elimination rates were determined by adding a linear trend line to all data points collected during the subject's elimination phase and using the slope of that trend line as the elimination rate. As noted on the graph, the highlighted data in the alcohol curve table were the points that were used to calculate the elimination rate. Elimination rates ranged from approximately 0.0158 g/dl/h to 0.0206 g/dl/h with an average elimination rate for all subjects of 0.0193 g/dl/h. Subject 1 and Subject 3 had the lowest elimination rates, yet it is likely that their calculated rates are the least accurate. Due to Subject 1 and Subject 3's prolonged absorption, the data points that were chosen to calculate the elimination rate may not have all occurred in the elimination phase. However, with so few data points available after the peak BAC it is difficult to determine which data points are strictly a part of the elimination phase.

### *Use of Instantaneous Absorption*

As mentioned in the procedure, the target BAC was calculated given instantaneous absorption of alcohol. It is impossible for a person to consume alcohol and have it instantaneously absorbed and distributed throughout the body. However, since elimination rates and absorption rates vary from person to person, unless the subjects' elimination and

## Alcohol Correlation Study, cont'd

absorption rates are known ahead of time, a BAC peak cannot be calculated by just adding a standard percentage to the target BAC.

### Suggestions for Future Studies

When analyzing the data, areas of improvement for future studies were noted. These include using the same written text for the typing exercise as well as collecting urine samples more frequently, and having the subjects void before the first sample is taken rather than at the start of the day. To observe a wider variety of symptoms over a longer period of time, a greater amount of alcohol should be administered. By calculating for a target BAC of 0.12% (W/V) rather than 0.10% (W/V), the elimination that occurs during the consumption, absorption, and distribution of alcohol will be negated. Lastly, to ensure that food in the stomach does not prolong alcohol absorption, not only should the subjects be instructed to finish eating at least two hours before the start of drinking, but they should also be instructed to eat a light breakfast.

## Ethical Dilemmas, cont'd

fications and explanations when required), and perhaps ensuring that all other employees are aware of their obligations.

### Summary

The employee and supervisor in this scenario may never be subject to ethics charges regarding this matter, because they might not belong to any of the associations quoted. However, the ethics concepts promulgated by different associations still offer anyone who handles evidence, or supervises or manages people who handle evidence, valuable guidance when determining the best workplace conduct.

#### \*Acronyms:

ABC: American Board of Criminalistics

AFTE: The Association of Firearm and Tool Mark Examiners

ANZFSS: The Australia & New Zealand Forensic Science Society Inc.

ASCLD/LAB: American Society of Crime Laboratory Directors Laboratory Accreditation Board

CAC: California Association of Criminalists

ENFSI: European Network of Forensic Science Institutes

NWAFS: Northwest Association of Forensic Scientists

\*\* NWAFS's code of ethics has not yet been ratified.



If you see these great CAC  
T-shirts in COLOR  
then you've found the  
online version  
of the CACNews!  
[www.cacnews.org](http://www.cacnews.org)

## CAC Merchandise?



store <sup>dot</sup> <sub>^</sub> cacnews <sup>dot</sup> <sub>^</sub> org

just.connect.the.dots





# Tracks in History

by Ernest D. Hamm

The precedence of tracks as the premiere form of associative evidence has been established. The early references dealt with the logical and oft cited use of tracks by early mankind for survival through animal recognition as food sources and avoidance of dangerous encounters. In the area of criminal investigation, there is the published but undocumented account of an application of track recovery in 1786 in the Richardson case. It has been suggested that the events of the Richardson case were the harbinger for the application of forensic science to the investigation of crime. (1)(2)

While the early references recognize the use of tracks through incidental or deliberate actions, they are historically unsubstantiated. However, there are several events recorded in history that support the recognition of tracks as a popularly accepted form of association. Tracks can tell a story; they are 'speaking evidence' because a track is "a mark...left by the passage of a person...". (3) They have been used for this purpose in legends and their representations have been preserved over the centuries.

*Teufelsschritt*, or Devil's Footstep, is at the *Frauenkirche* of Munich, Germany. It is an impressed shape of a foot that can be seen at the entrance of the cathedral, the construction



of which was completed in 1494 (Figure 1). Legends associated with this impression in solid stone are centered on an action purportedly by the devil just after the church was built. This action was also based on the placement of the stone with the impression in an area at the entrance of the church from which no windows can be observed.

There are two legends associated with the action of the devil when he first 'inspected' the church. The devil could not see any windows because he would not pass beyond the entrance. One legend states that he then forcibly and gleefully made the track in the stone because he thought this new church was worthless as it had no windows. The other legend

*This article was first published in the 4th Q 2010 edition of the FDIAI newsletter, (Florida Div. Int'l Assoc. of Ident.) and is reprinted with author's permission.*

is that the builder, having made some sort of deal with the devil, tricked him into believing there would be no windows in this church. The devil, upon learning he had been deceived, made the track in anger. (4)

The 'Ain Dara temple is in Syria and was built in 1300-900 BC as a shrine to a god, or perhaps goddess, of the region. A remarkable feature of this temple is the presence of three oversized footprints which were carved into stone slabs at the entrance of the temple. There are right and left bare foot prints 'standing' in what would have been the entrance of the temple (Figure 2). Then there is a left footprint further on in



the entrance as if a giant deity has taken a stride from the portico and entered the temple (Figure 3). Temples were often dedicated to a particular deity and legend would expect the deity to have visited its temple. A strange aspect of these carvings is that the footprints are of bare feet while other deity visages associated with the temple are wearing footwear in the carvings (5).

In both the *Frauenkirche* and 'Ain Dara instances, tracks have been permanently preserved and have legends associated with their presence. However, there are no records by the builders of why these tracks were so created and so background information on their true purpose is lost in antiquity. It is apparent that the image of a track made by a foot was used as it would be readily recognized and accepted as proof of an event by any seeing the 'evidence'. These are examples of tracks being used to support an association of a person, or object, with a scene or location.

There is yet another historical record of the use of tracks (6). This was not one used to illustrate some mystical association, but involved the use of tracks as an investigative aid that resulted in capital punishment. The documentation comes from scripture writings accredited to the Book of Daniel, but in verses relegated to the Apocryphal Books. (7)

Daniel was the trusted advisor to Cyprus the Persian, a king of Babylon. In the kingdom of Cyprus the Persian there was a Babylonian idol, Bel. This idol regularly received food and drink offerings by the followers of Bel, which included the king. However, Daniel refused to honor the Babylonian idol. When questioned on this lack of respect, Daniel told the king that Bel was only clay and bronze and could not consume food and drink. The king was angry about this lack of belief by Daniel and had the priests of Bel arrange a test.

The priests, 70 in all, were to prepare a feast of food and wine for the idol and place in on a table in the temple. The king would then personally seal the doors of the temple and inspect it the next day. Just before the king closed and sealed

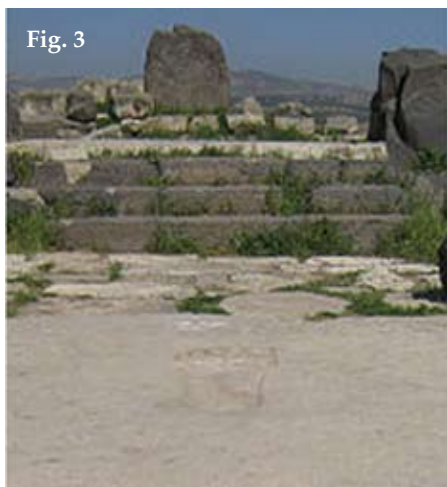


Fig. 3

the temple, Daniel had servants spread a layer of ashes on the floor of the temple.

The next day the king, with Daniel present, entered the sealed temple to find the food and wine had been consumed during the night. The king accused Daniel of blasphemy to Bel and ordered him to be

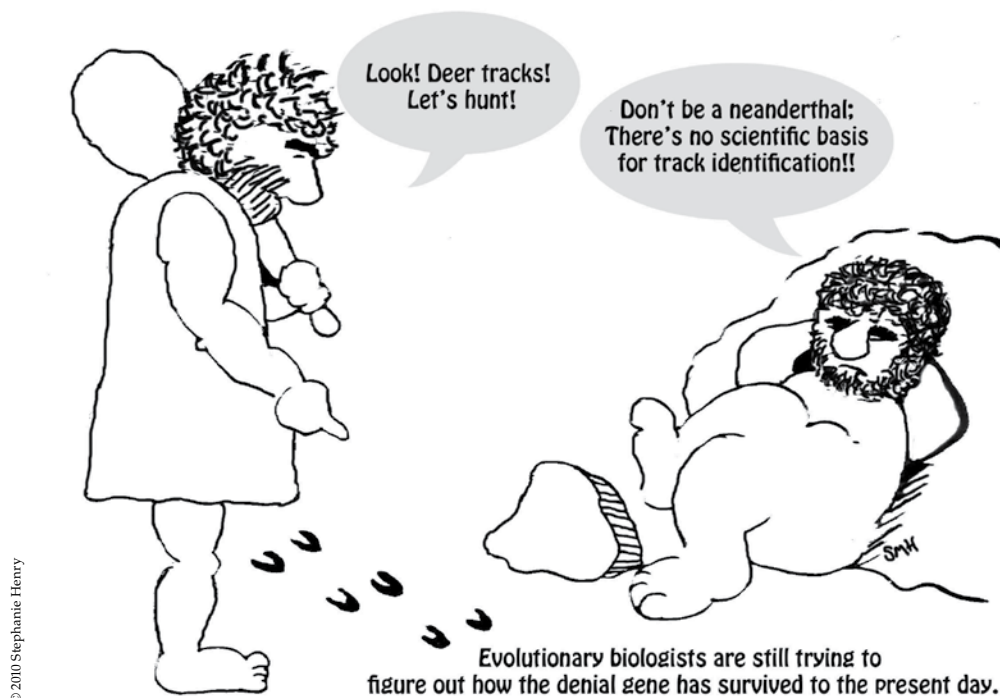
executed. However, Daniel had the king look at the floor and asked him about the footprints in the layer of ashes. The king saw the floor bore the footprints of men, women and children. He summoned the priests of Bel and learned they had a secret passage into the temple and had entered during the night with their families to consume the food and drink.

The king ordered that the priests and the members of their families be executed and the temple of Bel given to Daniel. Daniel had the temple destroyed.

This account, while not formally in the scriptures, is believed to have been written 150-100 BC.

## References:

- 1 Hamm, E. D. (1989). Track Identification: An Historical Overview. *J. For. Identification*, 39(6), 333-338
- 2 Hamm, E. D. (1994). Track Identification: An Historical Overview. *International Symposium on the Forensic Aspects of Footwear and Tire Impression Evidence*, FBI Academy, Quantico, Virginia
- 3 The American Heritage Dictionary of the English Language, Houghton Mifflin Company, Boston, 1982, p.1360
- 4 en.wikipedia.org/wiki/Munich\_Frauenkirche
- 5 Monson, John (2000). The 'Ain Dara Temple: Closest Solomon Parallel. *Biblical Archaeologist Review*, 26(3), 20-35, 67
- 6 Personal communication, Dr. Roger J. Davis, 1985 6
- 7 www.sacred-texts.com



© 2010 Stephanie Henry



Forensics Source is the one-stop shop for thousands of quality products, supplies and equipment for the forensics professional. From ABFO Scales to Zephyr Brushes, ForensicsSource.com provides customers with quick and easy access to the crime scene, crime lab and educational products needed to succeed in today's challenging environments.

**EVI-PAQ®****nik®**  
PUBLIC SAFETY**ODV™****iDenticator****projectina®**©2010Safariland - 022210-CAC/IAI



# ABSTRACTS

## OF THE FALL 2010 CAC SEMINAR OAKLAND, CA

HOSTED BY  
ALAMEDA CO. SHERIFF'S OFFICE  
CRIMINALISTICS LAB

### **The Fabric of Our Lives: Extracting Trace DNA from Ninhydrin-sprayed Cotton Fibers**

*Jumana Latif and Wellington Onyenwe (presenting), Alameda County Sheriff's Office Criminalistics Laboratory*

This experiment set out to possibly validate the usage of ninhydrin on clothing, or in this case, white t-shirts. The scenario that this would be applicable to would be that of a physical altercation such as a rape, robbery, etc. The goal was to retrieve typeable DNA from clothing.

Brand new white t-shirts were used for the experiment; one control shirt and one experimental shirt. Subject A touched the control shirt in six pre-marked areas on the front, while subject B touched six pre-marked areas on the back of the shirt. The experimental shirt was handled by both subjects vigorously and violently to simulate a fight. Subject A handled the front, whereas subject B handled the back. Both shirts were then sprayed with ninhydrin and allowed to develop. Six cuttings and six swabs were sampled for DNA from the control shirt and seven cuttings were sampled from the experimental shirt. Out of a total of nineteen samples, front and back, three samples from the experimental shirt and six samples from the control shirt gave trace quant results. The quant range was .0011–.015 ng/μl. The remaining ten samples gave no quant results. The samples that had trace results were amplified using the polymerase chain reaction method, yielding partial DNA profiles.

### **Extraction of DNA From Human Lip Prints**

*Vivien Lee, California Department of Justice Forensic Services Jan Bashinski DNA Laboratory*

Lip prints are commonly found on drinking glasses, paper napkins and duct tape (such as that used to bind a victim). Multiple studies have confirmed the uniqueness of human lip prints, and their individualizing characteristics have been used to identify suspects, much like fingerprints. However, there are caveats. Since lips lack sweat and sebaceous glands, the use of conventional fingerprint powders (that cling to bodily oil residue) and ninhydrin (which reacts with amino acids in sweat) have limited success (Castello, 2002).

Distortion, pressure, directionality, whether the mouth is closed or open, and how the lift tape is handled during evidence collection can produce different prints from the same

person. Due to these caveats, the extraction of DNA from lip prints may be a preferred technique to the visual identification of lip prints.

This research sought to determine the feasibility of DNA extraction from lip prints on glass cups and paper napkins, both with and without contamination with lipstick or fingerprinting powder. The study also tested whether an organic or silica-based extraction method was more suitable, what PCR conditions provided optimal amplification, and what effect, if any, contamination and age had on STR typing using the Applied Biosystems™ AmpFISTR® Identifier PCR Amplification Kit.

### **Automating DNA Extractions Utilizing the DNA IQ™ Casework Pro Kit on the Maxwell 16® Instrument**

*Cami Green, Promega*

The Maxwell 16® instrument offers forensic laboratories fast and reliable extractions of casework type samples such as blood stains, semen stains, cigarette butts, and touched samples. Automating the DNA extractions can dramatically reduce the hands-on bench time and potential pipetting variability. The new DNA IQ™ Casework Pro Kit for the Maxwell 16® instrument has been redesigned and optimized for improved DNA yields. This presentation will summarize the extraction performance of the DNA IQ™ Casework Pro kit which utilizes the unique DNA IQ™ Resin that eliminates PCR inhibitors and contaminants frequently encountered in casework samples. In addition, the presentation will include comparison testing data using the organic extraction protocol and other commercially available extraction methods.

### **Overview of the Cold Hit Outcome Project (CHOP)**

*Eva M. Steinberger, California Department of Justice Forensic Services Jan Bashinski DNA Laboratory*

The Cold Hit Outcome Project (CHOP) is an extension of the CAL-DNA Data Bank. It is an interactive database designed to follow the course of progress of offender hits and case-to-case matches. The CHOP database can also be used as a tool for the management of unsolved DNA cases. CHOP will eventually serve as a clearinghouse for state-wide information on DNA Data Bank hits and unsolved DNA cases.

CHOP was developed by the California Department of Justice (DOJ), Bureau of Forensic Services (BFS) in partnership with the Western States Information Network (WSIN). The CHOP database is located within WSIN's Regional Information Sharing System Network (RISSNET).

On September 15, 2009, the CHOP database was deployed to a limited group of agencies participating in the pilot version of CHOP; additional participants are being added on a continuing basis. To date the CHOP users group has grown to 270 individuals in 13 counties.

Presentation to include CHOP benefits, restrictions, database requirements and how to become a CHOP user.

## Integration of the Automated PrepFiler™ Extraction System into an Automated High Volume Casework Scheme

Robert Binz, Orange County Crime Laboratory

Over the course of a year, the Orange County Crime Lab (OCCL) receives thousands of burglary cases, containing tens of thousands of samples. As a result, the DNA lab has decided to incorporate the automated PrepFiler™ extraction system, developed by Applied Biosystems™, into their DNA processing scheme to handle the increased caseload. This system, which utilizes the Tecan Freedom EVO® robotic liquid handling system, will be used to extract DNA from samples collected from high volume property crimes. In addition to blood and cigarette butts, these samples include swabs of handled items, which tend to contain lower quantities of DNA. In order to accomplish the validation rapidly and to involve less OCCL analyst time, the services of an outside vendor were utilized. The automated extraction system, in conjunction with other downstream robotic systems, will be one of the final steps in completing our high volume casework line and is anticipated to greatly reduce the amount of analyst time in processing samples.

This presentation will illustrate the steps needed to prepare for this validation, the validation process itself, the pros and cons of using an outside validation team, and the overall benefit of automation for use in processing high volume property crime evidence.

## Micro-total Analysis Systems for Nucleic Acid Analysis

Ivan K. Dimov (Presenting) and Ben Ross, DiAssess, Department of Bioengineering, University of California, Berkeley

Compared to conventional macro-scale laboratory methods, integrated Micro-total analysis systems (μ-TAS) offer potential advantages of lower cost, higher speed, smaller sample and reagent volumes, and automation of all processes from sample preparation to analytical result: the “sample-to-answer” concept. However, potentially the most important consequences of successfully implementing μ-TAS are the enhanced assay reliability with less contamination and precise quantitative results relative to classical analytical procedures.

In this presentation we will examine applications of μ-TAS systems in genetic analysis, specifically forensics sample-to-answer systems and the use of isothermal nucleic acid amplification. Due to the high robustness and low requirements of Loop-mediated isothermal amplification (LAMP) a novel set of devices for multi-disease point of care are being developed. This technology was initially leveraged for the combined diagnostics of HIV and TB, diseases that combined kill about 5 million people per year. LAMP amplification is also combined with a novel aptamer desorption sensing technique to enable the highly sensitive detection (down to 50 bindings) of protein biomarkers with visual readout.

Finally we will conclude the talk with potential future applications of this technology for portable analyses systems that produce onsite results and eliminate the need for sample collection, transportation and preservation and reduce potential contamination and the required sample volumes.

## The ‘Investigator Quantiplex Kit’ – A Novel Fast and Accurate Real-time PCR Quantification Assay – Combined With Automated Reaction Setup Further Streamlines the Forensic Workflow

Scott Burrows (Presenting), Francesca Di Pasquale, Stefan Cornelius, Margaretha König, Mario Scherer, Claudia Schmid, Claudia Dienemann, Lars Brochmann, Anke Prochnow, Thomas Schnibbe and Holger Engel QIAGEN GmbH, QIAGEN Strasse 1, 40724 Hilden, Germany

Commonly short tandem repeat (STR) analysis is performed for human identification, although alternative approaches like the analysis of deletions and insertions (DIPs) have recently become commercially available.

However, these multiplex assays used for human identification are complex systems that require a defined range of DNA template input. Accuracy of quantification, even for samples of low concentration, and an assessment of the presence of PCR inhibitors are key requirements to ensure successful genotyping on the first pass.

Quantitative real-time PCR has become the standard method for quantification of DNA in forensic samples. However, there is a need for advanced solutions further streamlining the forensic workflow by increasing the accuracy of the quantification results, especially for samples of low concentration, and reducing the time for analysis by faster procedures. Therefore we developed a novel human DNA quantification assay – the Investigator Quantiplex Kit – which provides fast and accurate quantification of human DNA in forensic database and casework samples. The assay provides sensitivity down to less than 2 pg/reaction (preliminary data - developmental validation of limit of detection still ongoing), with highly accurate quantification in linear range of standard curve of less than 10 pg/reaction. Detection of PCR inhibitors is ensured by a balanced internal amplification control. The Investigator Quantiplex assay makes use of PCR fast cycling technology allowing fast time to result. When used with the Rotor-Gene Q Real-Time PCR system, quantification can be performed in less than 50 minutes.

Automation of laboratory procedures is gaining more and more importance in the forensic laboratories, saving time for routine procedures like PCR set-up and performing dilutions while also limiting user errors.

The QIAgility system is a bench top instrument allowing automation of routine procedures in the forensic PCR laboratory workflow, involving PCR setup for real-time PCR based DNA quantification. The instrument also allows automated adjustment of DNA concentration of forensic samples to a specified concentration making use of real-time PCR based quantification results. Additionally, the reaction setup of the multiplex human identification assay, either STR or DIP based, can be performed by the instrument, as well as preparing samples for CE.

The combination of the new human DNA quantification assay with advanced instrumentation like the Rotor-Gene Q significantly shortens time to results in forensic DNA quantification with increased accuracy and sensitivity. When combined with the QIAgility instrument, the workflow can be further streamlined and time consuming and error-prone manual interactions are minimized.

## Tools for Estimating the Weight of Evidence for Difficult DNA Profiles

Kirk E. Lohmueller, PhD; Norah Rudin, PhD; Keith E. Peterson Inman, M.Crim. University of California, Dept. of Integrative Biology; Forensic DNA Consulting; California State East Bay, Dept. of Criminal Justice Administration

One of the most difficult issues with which forensic DNA analysts currently struggle is the interpretation of complex samples. In particular, low template (LT) samples, or worse yet mixtures including LT components, present a particular challenge to the practitioner in estimating the weight of such evidence. Many laboratories employ a combined probability approach, e.g. CPI, CPE, RMNE. Various iterations of those calculations include using peak heights or information about a known intimate contributor to attempt to deconvolute a mixture. Another common approach is to employ some variation of "2p" to estimate the statistical weight of an observed single allele.

The advantage to such approaches is mostly that the calculations are relatively easy. Another proffered advantage is that they generally tend to underweight the evidence, and hence are described as "conservative." In fact, a combined probability statistic, in particular, potentially discards much of the information in a sample, artificially reducing the weight of such evidence. However, underweighting the evidence is not necessarily "conservative" in the context of the case. For example, the defense may have an alternate suspect who could be a minor contributor to a sample, in which case a greater evidential weight would be more beneficial to the defendant. Situations also exist in which a combined probability statistic can actually overweight the evidence, in particular if the H0 (primary) hypothesis (which may or may not be the prosecution hypothesis) requires allelic drop-out. In the extreme, a reference subject can actually be falsely included by assuming that the impact of potential drop-out is neutral.

Most analysts understand that a combined probability approach is not the optimal method for estimating the statistical weight of the evidence, but perceive roadblocks in implementing the more sophisticated and powerful approach inherent in a likelihood ratio (LR). The two main challenges are: 1) lack of an accessible, inexpensive, user-friendly computer program, and 2) a reliable method to estimate allelic drop-out (DO) probabilities. In this workshop we will present solutions to both of these issues. In particular, we will review the open source R-code program written by Dr. David Balding<sup>1</sup> and freely available for download on his web site<sup>2</sup>. We will discuss a current project to add a user interface to the R-code that would make it more accessible to the average analyst<sup>3</sup>. We will also present ongoing work to estimate the probability of drop-out using a method similar to that suggested by Tvedebrink et al.<sup>4</sup>

Specific examples that demonstrate the utility of a LR approach in assisting the analyst to provide an accurate and reliable estimate of the weight for a difficult profile will be presented.

1. Balding, D.J., Buckleton, J. Interpreting low template DNA profiles. (2009) Forensic Science International: *Genetics* 4, 1-10.
2. [www.zebfontaine.eclipse.co.uk/djb.htm](http://www.zebfontaine.eclipse.co.uk/djb.htm); scroll down to "software"
3. Partially funded by a McLaughlin grant
4. Tvedebrink, T., Eriksen, P.S., Mogensen, H.S., Morling, N. (2009) Estimating the probability of allelic drop-out of STR alleles in forensic genetics. Forensic Science International: *Genetics* 3, 222-226.

## Species Discrimination of White-tailed Deer and Mule Deer by Microsatellite Markers

Megan Caulder, California Department of Justice Forensic Services  
Jan Bashinski DNA Laboratory

Wildlife forensic casework often requires species identification prior to individualization. Particularly challenging cases may require discrimination of phylogenetically closely related species with overlapping geographic distributions, such as North American deer. We screened deer (*Odocoileus* sp.), cattle (*Bos Taurus*), and elk (*Cervus elaphus*) nuclear microsatellite DNA loci for differences in allele characteristics to develop a panel that would discriminate between white-tailed deer (*O. virginianus*) and mule deer (*O. hemionus*). Using our panel of nine microsatellite loci and one sex-typing marker, we established population data for 237 deer spanning the states of Washington, Wyoming, Montana, Colorado, and Arizona. All of the individual species assignments using this autosomal DNA data, and an analysis using the software GeneClass2, correlated with their reported assignment based on morphology. These results provide a new tool for forensic poaching cases involving deer species identification.

## The Evolution of Forensic DNA Technologies

Brad Dixon, Applied Biosystems Part of Life Technologies

This presentation will discuss Applied Biosystems' role in the development of DNA technology for human identification applications. As forensic analysts are presented with an increasing number of sample submissions from a wider range of sample types, Applied Biosystems' forensic technologies have expanded to address the complete DNA analysis workflow, from extraction to data analysis.

The Prepfil<sup>TM</sup> Forensic DNA Extraction kit chemistry has been developed to yield high quantity and high quality DNA for low to high throughput workflows. The Automate Express<sup>TM</sup> instrument employs the Prepfil kit chemistry in an easy to use, flexible benchtop system with a convenient 13 sample throughput for casework laboratories. The Quantifiler<sup>®</sup> Duo DNA Quantification kit is a powerful predictive tool allowing analysts to detect the presence of male:female DNA mixtures, indicate the presence of inhibitors and determine the quantity of total human and male DNA.

Early advancements in short tandem repeat STR kit development included the application of 5-dye technology and mobility modifiers to accommodate more loci in a smaller size range, the development of enhanced buffer systems to overcome inhibitors of the polymerase chain reaction (PCR) and the launch of the AmpFISTR<sup>®</sup> Minifiler<sup>TM</sup> kit, the first commercially available kit to reduce the amplicon size enabling better amplification of degraded DNA.

We will discuss the recent optimization of the Identifiler<sup>®</sup> kit chemistry to address the specific requirements of casework and databasing laboratories. To relieve the data analysis bottleneck, the GeneMapper<sup>®</sup> ID-X software has been developed as an expert system for analysis of single source databasing samples with enhanced features such as the mixture analysis tool to aid in the interpretation of casework samples. These technology advancements and efficiency improvements are driven by global adoption of DNA methods and rapidly expanding worldwide databases. Forensic analysts seek methodologies designed to increase productivity, reduce time to result, maximize the quality of results obtained and decrease costs.



Improvements to each step of the workflow: extraction, quantification, amplification and data analysis have been made to increase the efficiency of forensic DNA sample processing.

## **The Implications of Suppressed, Falsified or Undisclosed Lab Information in Litigation: A Review of the Law and Practicalities**

*John Philipsborn, Attorney*

This presentation will use concrete examples such as the "SFPD Lab 'Scandal'" and the DNA section issues in Houston, to review the legal obligations of the prosecution to provide exculpatory or impeaching information under the Brady doctrine, and the practicalities of the way that lawyers knowledgeable about such litigations approach these sorts of issues. This presentation will be given by a lawyer who has been involved in such litigation in various parts of the country.

## **Exploration of Gasoline-Pool Tablet Mixtures**

*Katherine Hutches, Bureau of Alcohol, Tobacco, Firearms and Explosives*

Hypergolic, or self-igniting mixtures are potentially used as more subtle means of ignition for incendiary devices. In online forums such as the Jolly Roger, there are references to a new type of hypergolic mixture consisting of gasoline and pool chlorinator, which supposedly form an instant fireball on combination. The effectiveness of this mixture for energetic self-reaction, as well as the effects of the mixture on fire debris analysis, will be discussed.

## **Reiser Case**

*Paul Hora, Alameda County Deputy District Attorney*

A presentation on the Hans Reiser Murder case. The murder occurred on September 3, 2006. Nina Reiser, Hans' estranged wife, was initially reported as a missing person, but the missing person investigation resulted in Hans Reiser's arrest for murder on October 10th, 2006. Nina's body was never located and the case proceeded to trial. The jury convicted Hans Reiser of 1st degree murder. Following his conviction, Hans Reiser agreed to disclose the location of Nina's body in exchange for a plea of guilty to 2nd degree murder. The case involved an extensive and lengthy investigation including a substantial amount of criminalist work. My presentation will provide an overview of the murder case, including but not limited to: the investigation, forensics, evidence collection, the trial and the body recovery.

## **The Confocal Microscopy Analysis of Ten Consecutively Manufactured Ruger P95 Breech Faces**

*Todd Weller, Oakland Police Department Crime Laboratory*

This presentation will show the results of confocal microscopy analysis of ten consecutively manufactured pistol slides. Confocal microscopy allows one to collect and numerically record three dimensional topography. The purpose of this study was to use this technique to study test fires recovered from pistols with consecutively manufactured breech faces.

This study provides numerical, objective validation that consecutively manufactured firearms can be distinguished

from each other using the marks left on fired cartridge casings. Additionally, this study provides objective validation that cartridge cases can be associated to a firearm through the comparison of these same markings.

## **Examining 3D Topography Relationships of Striated Marks on Bullets Using Through Focus Microscopy**

*Jessica Morning, University of California, Davis Forensic Science Graduate Group*

After attending this presentation, attendees will have an understanding as to the current research on striated marks within the land impression of bullets and efforts to reproducibly record them in a quantitative way. Previous work has focused on using confocal microscopy to record the surface of the land impressions and then make comparisons based on cross correlation functions of the entire surface. It was determined that this method involved too much computing power for it to be feasible as a new national searchable database. This study is the first step in developing a simpler record of the striations for each land impression that can be used in a database on an average desktop computer.

We asked what is the topographical nature and relationship of striated marks on bullets within the land impressions? There is an expectation that the stria will start, stop and drift as you move toward the nose of the bullet. Through focus microscopy uses layered multiple image slices to render three dimensional images in full focus along with height data. We are using this technique to make multiple comparisons along the length of the bullet surface, specifically examining profiles that cut across the striations. From these profiles, the positions of the maximum heights, corresponding to peaks or light regions in an image, and minimum heights, signifying valleys or dark regions in an image, are to be ascertained. These positions are recorded for comparison. In this way, the variations of the striae within a specified area can be compared to the data collected by a firearms examiner using a bridge microscope. The ultimate goal is to determine the position and total number of profiles required to capture all or the vast majority of the variation within the area.

## **Forensic Breath Analysis Lie Detection: A Novel Idea**

*Michael K. Hemp*

In 1994, I had a conversation in a Carmel cottage with the president of a high tech firm located in Mountain View, California. He explained to me in fascinating detail some of the capabilities of an emerging technology his company had acquired, utilizing new GC-MS techniques. Its capabilities stunned me and as I later thought of all the chemical processes and ultratrace-level compounds that could be definitively analyzed, it struck me: "What if that most exquisite electrochemical machine, the human brain, could be monitored to identify a thought process using GC-MS breath analysis? Everyone knows that various "breathalyzers" can accurately identify compounds in the breath. What other evidence is there in the bouquet of chemical compounds expelled in the human breath? Could there be an unexplored record of our human behavioral chemistry in that gaseous chemical exhaust? Could it identify the chemistry of the human lie?"

Had the hypothesis that GC-MS/LI-MS could identify the molecular biochemical signature for the human lie

emerged from a laboratory, it would surely be far advanced in feasibility and development—and probably highly classified. However, since it emerged from a historian's fertile mind, it is neither widely known nor accepted as yet in forensic circles, (though SRI has shown particular interest).

Earliest support for the premise of a breath and skin-pore analysis lie detection technology came from an expert source: leading forensic biochemist, Dr. Brian Andresen—former director of the Forensic Science Center at Lawrence Livermore National Laboratory. In the Epilogue of *The Nadjik Pheromone* he writes:

In *The Nadjik Pheromone*, Michael Hemp presents a fictional, robotic system—a computer guided gas chromatography-mass spectrometry (GC-MS) instrument able to detect specific, universal biological molecular markers for the human act of lying. While monitoring breath and skin utilizing specialized polymer concentrators for deception compounds, this new GC-MS lie detector technology literally “smells the truth” in gaseous chemical pheromone-like human effusion.

What is new today in the premise of “*The Nadjik Pheromone*” is that the search for the specific bio-chemical fingerprints for the human act of lying is a real goal. The futuristic “*Nadjik Pheromone*” lie detector technology of breath and pore analysis technology may soon be a reality for all of us.”

“*The Nadjik Pheromone*” began as a screenplay in 1994; in 2008, it became a novel: an American war correspondent's passion to end genocide and crimes against humanity. A March 2010 presentation of “*The Nadjik Pheromone*” to the ACS San Francisco conference at Moscone Center heralded the initial awareness and interest by the forensic science community. That presentation prompted its nomination for a subsequent presentation to the CAC.

The application of an irrefutable and scientifically verifiable lie detection technology has implications of unprecedented historic and global consequence. Therefore, this presentation will center on the sincere proposal to the interested scientific community to apply their newest pre-concentration techniques to “fast GC-MS analysis” in a search for key chemical fingerprint profiles that can point to a “real” non-fictional lie detection technology.

## **Characterization of Surface-Modified Fibers by X-Ray Photoelectron Spectroscopy**

*Bob Blackledge*

X-ray photoelectron spectroscopy (XPS) is a method of surface analysis. In XPS a surface is irradiated with a monochromatic x-ray beam and the number and kinetic energy of escaping electrons is measured. With most surfaces examined the depth of penetration is no more than 10 nm, with most of the signal coming from within 6 nm or less. Because the binding energies of electrons at various energy levels for the different elements are known, XPS is a quantitative method of elemental analysis for surface layers. However, because the binding energy of an electron in an atom is slightly affected by the atom's oxidation state as well as to which other atoms it is bonded, XPS also provides information about the chemical state of the elements in the sample.

## **Inhalants an Undetected Danger: Creation and Validation of a Headspace Gas Chromatograph Method for the Analysis of Hydrofluorocarbons in Blood**

*Chelsea Carter, San Diego PD, Forensic Chemistry Unit*

This presentation will discuss the research, development, and validation of an inhalant detection method now being utilized at the San Diego Police Department. Social implications of inhalant abuse such as inhalant abuse in children, adolescents, and adults, the prevalence of inhalant abuse in our military, as well as the physiological effects of the drug will be discussed.

Inhalants are considered any volatile substance whose chemical vapors can be inhaled to produce psychoactive effects. They are considered a gateway drug, much like alcohol and marijuana, which can lead to lifetime drug use. In a national 2008 study, it was noted that there were twice as many new inhalant abusers as there were cocaine abusers; and inhalant abusers covered a much larger age range. Accessibility is partly to blame for this rise in abuse as there are over 1,000 commonly sold products that are cheap, legal, and toxic. An increase in inhalant based arrests led to the development of a method that would detect commonly abused inhalants.

The method created accurately separates and detects 1,1- Difluoroethane, 1,1,2- Tetrafluoroethane, Ethylene Dichloride, and Toluene. This method was recently utilized in a manslaughter case that is currently being adjudicated. A case discussion will be included in this presentation.

## **Sustained Combustion of Bodies: Some Observations**

*John D. DeHaan, Ph.D., President Fire-Ex Forensics, Inc.*

When a body is involved in a fire, it is often thought of by fire investigators as a passive target of heat and flame. In some cases, however, it becomes involved as a fuel package, contributing flames and heat of its own. It is, in rare cases, the major fuel package supporting flaming combustion in the vicinity of the body for much longer times than other fuels nearby. This paper will explore the combustion of human cadavers and similar large-animal carcasses as they burn in sustained fire environments. Previous tests have explored the thermal response and fuel characteristics in intense fires of relatively short exposure times. The tests discussed here will concentrate on fire tests where the body was the primary fuel package, but will also compare the results of fire exposures in well-fueled, well-ventilated fires in both vehicles and furnished rooms. These tests focused on long duration fires involving both intact human cadavers and torsos and whole pig carcasses of various sizes. Test fires included both fully involved vehicle and compartment fires, as well as non-accelerated, long-duration fires involving only the bedding and clothing (in the manner of typical accidental deaths where a dropped match ignites such materials).

It was observed that bodies are a complex fuel package offering several different fuels whose behavior and thermal properties vary a great deal. The subcutaneous body fat presented in nearly all bodies is, by far, the best fuel present. For it to contribute, however, the dermal layers have to shrink and split (from external fire exposure of several minutes duration), the body fat has to render out, and be absorbed by a porous, rigid substrate (often the charred remains of the bedding, clothing, upholstery, carpet or wood floor). The combustion then takes place where the body fat burns on the porous wick

as a flaming fire. Fires of 20-60 kW heat output have been observed in tests where the body was the main fuel source. The flaming combustion of the body has been observed to be sustained for 4 to 8 hrs.

The limited size of the fires means that radiant heat to nearby target surfaces is insufficient to ignite them, and usually only enough to scorch or soften them, and that the air supply needed to sustain the fire is very modest. A sustained fire fueled by a body is capable of burning for extended periods of time without spreading to nearby fuels, unless those fuels are in direct contact with the small flames produced. Such fires can be maintained in ordinary rooms, even with doors and windows closed. The small flames produced are capable of desiccation, charring, and calcination of exposed bone, with eventual collapse of exposed bony structures. Muscle and collagenic components will be charred and burned away if they are exposed to the direct flames. This paper will demonstrate the destructive effects of fire under a variety of conditions and address some of the mythology and misconceptions about bodies in fires.

### **Castro Valley Jane Doe**

*Greg Landeros, Detective, Alameda County Sheriff's Office*

Investigators will discuss the three year investigation into the murder of a sixteen year old girl whose decomposed body was found behind a local restaurant in Castro Valley, Ca. The case led investigators to Mexico on three separate occasions as they utilized forensic artists, forensic sculpting and DNA to eventually learn the identity of the victim, Yesenia Nungary Becerra and her killer, Miguel Angel Castaneda.

### **Evaluating the Probative Value of Sexual Assault Evidence Collected From Suspects**

*Chani Sentiwany, Oakland Police Department*

The objective of this study was to determine the probative value of collecting evidence from the suspect in a sexual assault. A retrospective study was designed to review information gathered from all analyzed suspect sexual assault exams from 2000 through 2009 at the Oakland Police Department. This included review of 49 suspect sexual assault kits collected by Highland Hospital in Oakland prior to February 2006 and 57 kits collected by VBS Services after February 2006. This study focused on the laboratory results from analysis of the penile swabs, scrotal swabs, and finger swabs. Data results will focus on the probative nature of each type of swab. Probative value was evaluated based on the percentage of the victim's DNA profile obtained. This talk will provide general descriptive information on age, sex, and ethnicity of both victim and suspect. Post assault interval results and trends will be provided. Data on the correlation of presence or absence of epithelial cells and obtaining foreign DNA will be discussed. A few illustrative cases will be described.

### **A Retrospective Study of 148 Sexual Assault Kits**

*Shannon Cavness, Oakland PD Criminalistics Division*

The objective of this study was to determine if there are predictors of yield within the forensic medical report with re-

spect to DNA profiling. A retrospective study was designed in which 148 sexual assault cases were selected for review from approximately 350 cases occurring between August 2003 and October 2007. In all cases, evidence was collected by medical practitioners at Highland Hospital in Oakland California and examined by criminalists at the Oakland Police Department (OPD) Criminalistics Laboratory. All cases assigned the penal code: 261 completed by laboratory criminalists within a specific time frame were examined for this report. No other penal code cases were utilized for this study. These cases include only sexual assault examination of victims aged 14 years and older. Of the 148 cases, 93 cases (63%) yielded a complete probative profile, a complete profile being defined as obtaining all alleles at all attempted loci for the specific amplification kit utilized during the processing of the case. It was determined that if sperm were observed by hospital staff during microscopic examination of the vaginal slide, they would be seen by laboratory staff 100% of the time. The inverse was not found to be true.

### **N-Acetylbenzocaine: Formation via Transacetylation of Benzocaine and Acetylsalicylic Acid in a Cocaine Exhibit.**

*Minh C. Nguyen, Forensic Chemist, DEA Western Laboratory*

N-Acetylbenzocaine was recently identified in an illicit cocaine HCl exhibit which also contained salicylic acid and traces of acetylsalicylic acid, and benzocaine. This presentation discusses the analysis and characterization of N-acetylbenzocaine, as well as its transacetylation synthesis pathway. Supporting analytical data from gas chromatography/mass spectrometry, gas chromatography flame ionization detection, Fourier-transform infrared spectroscopy, and Fourier-transform nuclear magnetic resonance spectroscopy are presented.

### **Survey of Sexual Assault Evidence Kits**

*Jennifer Riedel, Forensic Scientist, Oregon State Police, Springfield Forensic Laboratory*

Statistics regarding the results of Sexual Assault Forensic Evidence (SAFE) kit analyses would be helpful in educating law enforcement and medical personnel on sexual assault response efforts. This study evaluated the incidence of semen positive results from 469 rape victims' SAFE kit samples. The kits were submitted to two Oregon State Police laboratories between 2003 and 2005. Information from officer's reports and victims' statements was also collected. Overall, 46% of the 469 victims had at least one sample that was positive for semen. As the time elapse between assault and sample collection increased, the probability of a positive result decreased. That probability leveled out to approximately 26-27% after 36 hours, with a spike of 40% in the 48-60 hour range. Additional conclusions evaluated positive results based on body locations reportedly penetrated, condom usage, reported voluntary intercourse, and other factors. Instances when both vaginal and cervical samples were collected and yielded different results were also evaluated. This study determined that while the victim's statement remains a good trigger for which samples should be collected, they should not be solely relied upon. Vaginal and cervical samples should both be collected when possible.



## **Cases Examples: Lab, Coroner, and PD**

### **Working Together Well**

*Dr. M.J. Ferenc, Forensic Pathologist*

The Coroner is often an overlooked or marginalized component in a death investigation. The usual presumption is that the Coroner does the autopsy and then should not be heard from until the case reaches a courtroom. Two cases are given as examples of how the Coroner, the crime lab, and police can work together assembling criminal cases that they probably could not have put together otherwise

## **The Recovery of DNA on Improvised Incendiary Devices (Molotov Cocktails) Utilizing Various Fire Suppression Techniques**

*Lauren Buban<sup>1</sup> (presenting), John Jermain<sup>2</sup> (presenting), Clarissa Trogon<sup>1</sup>, and Steven B. Lee<sup>1</sup>*

*<sup>1</sup>San Jose State University; <sup>2</sup>Bureau of Alcohol, Tobacco, Firearms, and Explosives*

The use of improvised incendiary devices (weapons) against property and persons for various reasons has been an increasing problem in urban environments. Improvised incendiary devices are inexpensive to make and easily constructed. However, the damage inflicted by such a device is immeasurable and can cause serious physical injury and/or death. Of all improvised incendiary devices that can be constructed, the Molotov cocktail is the most common. Molotov Cocktails most commonly consist of a breakable glass container, an ignitable liquid (usually gasoline) and a lighted wick. The wick can consist of many different materials (examples: cloth or paper). The effects of a Molotov cocktail are maximized after the device is thrown against a hard surface, thus breaking the container and causing the liquid to ignite (from the lighted wick). While Molotov Cocktails are inexpensive to make and easy to construct, from a fire investigation perspective they can be easy to detect at a fire scene. Portions of the bottle bearing the most information about its origin, the neck with its labeling and the base with its cast-in-production data are the pieces of the bottle most resistant to mechanical and fire damage and usually survive intact. Identification of individuals who manufacture and use Molotov cocktails is of interest to law enforcement. Previous research conducted by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) has shown that DNA can be successfully recovered from the remains of a charred Molotov cocktail. While this is promising information, many Fire Investigators have speculated that perhaps the fire suppression techniques could be a factor in the DNA recovery.

In this study two samples sets of Molotov cocktails were prepared in replicate and were either ignited and unignited. Both sets were deployed at the Milpitas FD Training Tower. The two sample sets were further divided into six subsets where either they were allowed to self extinguish or were treated with different suppression techniques; water, foam,

CO<sub>2</sub>, dry chemical, and Met-L-X. In each subset, 50 ul of saliva were deposited onto three bottle lips, and 50 ul of TE on one bottle lip, for a total of forty-eight bottles. Two sequential wet swabs were used to collect DNA from each bottle lip, resulting in a total of ninety-six swabs. A phenol chloroform organic extraction was used to extract DNA, and quantitative PCR analysis was performed in duplicate to assess both inhibition and recovery. Amplification results with Identifiler and Identifiler plus without and with amplification enhancers will also be evaluated. Separation and detection of the amplicons will be performed by capillary electrophoresis (ABI 310). Qualitative and quantitative analysis of peak heights and balance will be conducted using Genemapper ID to compare recovery and inhibition from different extinguishers on control (unignited) and test (ignited) samples. Recovery of 190 ng of DNA was achieved from replicate 50 ul aliquots of liquid saliva. No detectable DNA was observed from negative controls. Preliminary results on control samples (self extinguished) indicate a higher recovery from the Molotov cocktail bottles that were unignited versus the ignited samples. DNA recovery was inversely proportional to the time it took to self extinguish. The recovery of DNA from the second wet swab was lower and in many replicates resulted in no detectable DNA indicating that taking a second swab may not be needed. This presentation will demonstrate the effects various fire suppression techniques have on the recovery of DNA from Molotov Cocktails.

## **Using the Neandertal Genome to Understand Recent Human Evolution**

*Richard Green, University of California, Santa Cruz*

Recent technological advances have enabled large-scale retrieval and sequencing of DNA from our closest relatives, the extinct Neandertals. To detect regions of recent positive selection in humans, to better understand our relationship to Neandertals, and to eventually understand Neandertal-specific biology we recently embarked on a project to sequence the complete Neandertal genome. To achieve this goal, several technological advances were required in recovery and identification of ancient DNA sequence from fossil bones. Having now accumulated and analyzed these data to address questions about recent human evolution. From these data, we estimate an average Neandertal-human genome divergence of about 800,000 years and a population split time of about 300,000 years. The latter estimate rules of one model of hominid evolution, namely that Neandertals are the descendants of *H. heidelbergensis*. Because Neandertals share some of the genetic diversity still extant within human populations, they make an ideal genetic comparison to test for recent positive selection in humans. Comparing Neandertal with human diversity, we find regions where little or no variation is shared with Neandertals. These are thus candidate regions for evolutionary changes that are the genetic basis of being fully modern humans.

## BOARD OF DIRECTORS

President:  
**Adam Dutra**



San Diego PD Crime Lab  
1401 Broadway, MS 725  
San Diego, CA 92101  
(619) 515-2793  
adutra@pd.sandiego.gov

President-Elect:  
**Kevin Andera**



Orange County Sheriff-Coroner  
320 N. Flower St.  
Santa Ana, CA 92703  
(714) 834-4510  
rd11311@fss.co.orange.ca.us

Recording Secretary:  
**Jamie Miller**



Orange County Sheriff-Coroner  
320 N. Flower St.  
Santa Ana, CA 92703  
(714) 834-4510  
jemiller@fss.co.orange.ca.us

Treasurer:  
**Michael Parigian**



Ventura Co. Sheriff's Lab  
800 S. Victoria Ave.  
Ventura, CA 93009  
(805) 662-6803  
michael.parigian@ventura.org

Regional Director: (North)  
**Meghan Mannion-Gray**



CA DOJ Jan Bashinski Lab  
1001 W. Cutting Blvd, Ste 110  
Richmond, CA 94804  
(510) 620-3300  
meghan.manniongray@doj.ca.gov

Regional Director: (South)  
**Mey Tann**



CA DOJ Riverside  
7425 Mission Blvd.  
Riverside, CA 92509  
(951) 361-5000  
mey.tann@doj.ca.gov

Membership Secretary:  
**Michelle Halsing**



CA DOJ Jan Bashinski Lab  
1001 W. Cutting Blvd, Ste 110  
Richmond, CA 94804  
(510) 620-3300  
michelle.halsing@doj.ca.gov

Editorial Secretary:  
**Gregory Matheson**



Los Angeles Police Dept.  
1800 Paseo Rancho Castilla  
Los Angeles, CA 90032  
(323) 415-8112  
B8927@lapd.lacity.org

Immediate Past President:  
**Mary Hong**



Orange County Sheriff-Coroner  
320 N. Flower St.  
Santa Ana, CA 92703  
(714) 834-6383  
mmh@fss.co.orange.ca.us

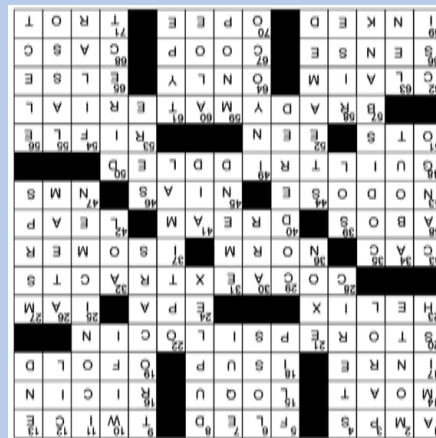


The "CAC logo" is a registered service mark of the CAC and its use is restricted to official communications and by other authorization of the CAC Board.

**i**nterested in  
becoming a  
member?

Visit us online at  
[www.cacnews.org](http://www.cacnews.org)

*Crossword puzzle solution.*



# CAC SPRING SEMINAR 2011



*Her Majesty requests your presence...*