



# The CACNews

News of the California Association of Criminalists • Second Quarter 2018

# The President's Desk

## Shaping the Paths

vincent  
**VILLENA**



*CAC President*

**The future of our organization and its membership depends on what we do to shape the paths to better forensic practices.**

Even though my tenure as your president draws to a close, in my last address, I would like to focus on the future. First, I would like to briefly discuss the future of forensic science in general by covering the importance of the collaboration among the scientific and judicial communities in the Organization of Scientific Area Committees for Forensic Science (OSAC).

What is OSAC and what is their purpose? With the dissolution of the National Commission on Forensic Science (NCFS) early last year, OSAC serves to maintain the communication among the field practitioners and *"strengthen the nation's use of forensic science by facilitating the development of high-quality forensic science standards that are fit-for-purpose, consensus-based, and scientifically sound,"* according to Mark Stolorow, director of OSAC Affairs, in the recently published *OSAC Newsletter*. Furthermore, Forensic Science Standards Board Chair, Steven Johnson, demarcated the OSAC's contribution to the field with the production of a registry of endorsed forensic science standards, information to the forensic science community to fill in the research needs and gaps, and publication of valuable information gathered during the standards analysis process in the new OSAC Technical Publications Series. Moreover, OSAC engages membership in interdisciplinary projects to standardize processes, terminologies, and reports across forensic science disciplines.

OSAC brings together more than 550 members and 325 affiliates in 25 forensic science disciplines, including practitioners, laboratory managers, academic researchers, metrologists, statisticians, human factors experts, accreditation and standards development experts, attorneys, and judges, representing federal, state, and local agencies, academic institutions, and private sector entities from all 50 states. The collaborative assignments discuss the technical qualities and foundations of existing standards, develop new clear-cut draft standards, and challenge members to generate documents that will move individual forensic science disciplines forward.

At the American Academy of Forensic Sciences' most recent conference, the U.S. deputy attorney general Rod Rosenstein addressed what the Department of Justice plans to do in response to the expiration of the NCFS and the instauration of a new commission on forensic science. He stated that the Department of Justice is proceeding with a series of initiatives to improve the empirical foundations of forensic sciences. *"The new measures will advance the practice of reliable and responsible forensic science in federal court. Our department is committed to leading by example,"* he announced.

The future of our organization and its membership depends on what we do to shape the paths to better forensic practices. I implore everyone to participate in, or at the very least keep up-to-date with, the challenges and changes leading up to the future of forensic science.

The past year has fled with still so much more for me to accomplish. Every president begins his or her tenure with a list of goals to accomplish during one's term. Fortunately, I still have a year left as the Immediate Past-President to tie some loose ends. I hope for the Education Committee to be fully operational to expand our reach to every forensic science program in the state. The expansion of the Publications Committee to include more webmasters to streamline the website and make the responsibilities more manageable is also underway. Our social media outreach hopefully allows a more expansive dissemination of information and connections among members and interested parties. Another ambitious undertaking was the publication of a procedures manual to consoli-





# The CACNews

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



## Glitter as Trace Evidence

Most glitter particles are typically three or more separate layers of various types of polymers. They will be translucent and have a different color in transmitted light (left side) than in reflected light.  
—Concept suggested by Bob Blackledge

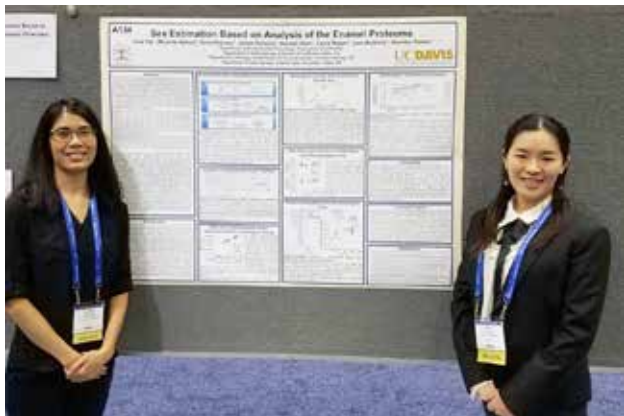
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Seattle played host to the 70th annual meeting of the American Academy of Forensic Sciences. As always, there were many connections to the CAC to be found. Greg Laskowski (*below, r*) kicked off the meeting with his sold-out breakfast session talk, “My Experiences as a Forensic Science Consultant for Crime Drama Television Series.” Among the many poster presenters were Jennifer Milan and Julia Yip (*below, l-r*) whose offering was titled, “Sex Estimation Based on Analysis of the Enamel Proteome.” An idea worth borrowing was a free-standing exhibit consisting of one poster for every AAFS president since the group’s inception in 1948. (*bottom*)

Perhaps the most relevant and intriguing connection came from a brief presentation by psychological researchers Amanda Farrell and Timothy Ainger who spoke about their ongoing study of the adverse psychological impact on first responders. This was a perfect tie-in with the series of articles appearing in the *CACNews* 4th Q 2015, “Having the Discussion,” which included essays by Raymond Davis, Janet Patel,



Greg Matheson, Meiling Robinson and Jerry Chisum. From the AAFS abstract: “...be more aware of the various types of trauma that investigative personnel routinely encounter and the potential impacts this may have, not only on the individual, but on the investigation. Paths forward and the development of Evidence-Based Policy will also be addressed, so attendees can examine what policies and assistance are available in their own agencies.”

“This presentation will impact the forensic science community by opening discussion on a topic that is not only often considered to be taboo, but also by highlighting the potentially different trauma experiences that investigative personnel face and how, while more attention is being placed upon first responder exposure to trauma and their subsequent resilience, this focus may mask or overlook specific needs of investigators who are likely to experience trauma for a longer duration and in a different manner.”

Of particular note was an announcement that the ubiquitous *Journal of Forensic Sciences* will no longer be published in hardcopy format starting this year.





# The President's Desk

date all or most of the CAC's documents and create those that are lacking. I have also tried to rekindle our relationship with the Chartered Society of Forensic Sciences by communicating directly with their CEO. Our upcoming joint seminar in 2019 will hopefully strengthen our communication and connection with each other.

As I sign off on my last president's message, I invite everyone to attend the Spring Seminar in Concord. The meeting will be hosted by the Contra Costa County Crime Lab who I am certain will deliver an amusing and informative colloquium. It is also a time for me to share more information in our semi-annual business meeting and to award deserving members for their service and accomplishments. I will also be passing the torch to our President-Elect, Mey Tann, who along with the rest of the Board of Directors and Committees had been exceptionally instrumental in running this organization with such ease and efficiency the past year.

Thank you for this opportunity to serve you. It has truly been the highlight of my career in forensics.

*Carlynn*



## Spring 2018 CAC Offers Workshops, Speakers and Royale Fun

The organizers of the upcoming spring CAC seminar plan a "Casino Royale" banquet to go along with their James Bond theme. They report that they are "hoping to have presentations for the Sierra La Mar case from Santa Clara County, as well as the Asiana Airlines SFO crash. We will also have a shooting incident reconstruction presentation by Luke Haag on the JFK assassination."

If that weren't enough reason to plan a trip to Concord, they also expect to have three full-day workshops: DNA, Processing of Officer-Involved Incidents, and Technical Writing for Criminalists, and three half-day workshops: Entomology, Uncertainty of Measurement (hosted by Mettler-Toledo), and an Alcohol-Impairment study. Visit [www.cacnews.org](http://www.cacnews.org) for the latest seminar information.

## Forensic Science Associations & Organizations

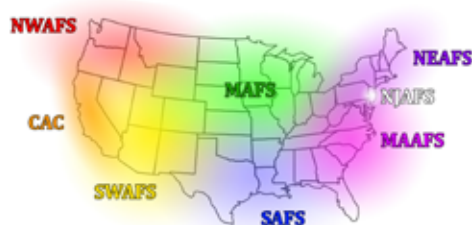
These graphics indicate major associations, stressing, but not limited to, those for bench-level practitioners. Although an association may be regional, membership is generally open to anyone outside that region.

Please be aware that this list is likely not comprehensive. Categorization as bench-level or managerial should be taken loosely.

See also: <http://www.forensicpage.com/new02.htm> and <http://www.occl.ocgov.com/Information/Acronyms.aspx>

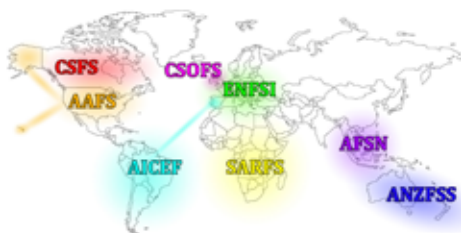
—Carolyn Gannett

### MAJOR REGIONAL PRACTITIONERS' ASSOCIATIONS IN THE US



CAC <sup>1</sup>	California Association of Criminalists
MAAFS <sup>1</sup>	Mid-Atlantic Association of Forensic Scientists
MAFS <sup>1</sup>	Midwestern Association of Forensic Scientists
NEAFS <sup>1</sup>	Northeastern Association of Forensic Scientists
NJAFS <sup>1</sup>	New Jersey Association of Forensic Scientists
NWAFS <sup>1</sup>	Northwestern Association of Forensic Scientists
SAFS <sup>1</sup>	Southern Association of Forensic Scientists
SWAFS <sup>1</sup>	Southwestern Association of Forensic Scientists

### SOME MAJOR ASSOCIATIONS IN OTHER COUNTRIES



AAFS <sup>1,2</sup>	American Academy of Forensic Scientists
AFSN <sup>2</sup>	Asian Forensic Sciences Network
AICEF <sup>2</sup>	Acad. Iberoamericana de Criminalística y Estudios For.
ANZFSS <sup>1</sup>	Australia and New Zealand Forensic Science Society
CSFS <sup>1</sup>	Canadian Society of Forensic Scientists
CSOFS <sup>1</sup>	Chartered Society of Forensic Scientists
ENFSI <sup>2</sup>	European Network of Forensic Science Institutes
SARFS <sup>2</sup>	Southern Africa Regional Forensic Science Network

### ASSOCIATIONS AND ORGANIZATIONS WITH AN INTERNATIONAL BASE



ACSR <sup>1</sup>	Association for Crime Scene Reconstruction
AFDAA <sup>1,2</sup>	Association of Forensic DNA Analysts and Administrators
AFDE <sup>1</sup>	Association of Forensic Document Examiners
AFTE <sup>1</sup>	Association of Firearm and Tool Mark Examiners
CFSO <sup>2</sup>	Consortium of Forensic Science Organizations
IAAI <sup>1</sup>	International Association of Arson Investigators
IABPA <sup>1</sup>	International Association of Bloodstain Pattern Analysts
IAI <sup>1</sup>	International Association for Identification
ICSIA <sup>1</sup>	International Crime Scene Investigators Association
SOFT <sup>1</sup>	Society of Forensic Toxicologists
SWFS <sup>1</sup>	Society for Wildlife Forensic Science
TIAFT <sup>1</sup>	The International Association of Forensic Toxicologists

<sup>1</sup>Bench-level

<sup>2</sup>Managerial

<sup>3</sup>A certifying or accrediting organization

<sup>4</sup>A federal government entity that ensures the quality of forensic science in the UK

## meiling ROBINSON



*CAC Editorial Secretary*

*Last year the LAPD Forensic Science Division hosted Dr. Itiel Dror who provided us training in a two-day workshop entitled "Cognitive and Human Factors in Forensic Decision Making." At that time, my colleagues posed interesting questions and a healthy debate on the subject of cognitive bias had occurred.*

*On December 13, 2017, I sat with Dr. Dror for an informal interview to follow-up and further discuss those issues brought up during the workshop. The purpose of this conversation was to highlight the topics discussed in the workshop with the intention of sharing it with CAC members who have not taken this type of training and with those who are perhaps considering similar training.*

A handwritten signature in cursive script that reads "Mei".

## An Interview with Dr. Dror

**Meiling Robinson [MCR]:** How did you get interested in the study of bias?

**Dr. Dror:** Well I'm not interested in bias. I'm interested in different factors that mediate how people make decisions. So I wouldn't say I'm interested in bias, bias is just one of many different factors that affects how people and experts consider information, weigh information, reach decisions. I've been interested in the human mind for a long time and I am interested in why people, and especially experts, are not always rational, not driven solely by the data. In other words, why smart people do stupid things. So cognitive bias falls under the umbrella of understanding different things that impact how people make decisions. When they're rational, it's kind of boring. It's like a computer, like a robot they consider the information. But why smart people don't do that, that's my interest.

**MCR:** So as a follow up to that, then specifically, is this any decision making or is it in application in a workplace?

**Dr. Dror:** My personal interest is in expert decision making. Sometimes people come and think I can help them. And I say to them jokingly: don't tell me about your problems, I have enough of my own. I cannot help you because I'm not a clinical psychologist. I'm not trained and I don't understand clinical psychology, when people have personal issues and problems. And I am interested in how people make personal decisions, such as whether to get married or not, or get a divorce, or buy a house or stuff like that. My interest is in expert decision making. People who are especially trained and gifted and have expertise in a certain domain.

**MCR:** What fields have you applied this study to?

**Dr. Dror:** I started with U.S. Air Force pilots and pilot decision making, and also do worked in the medical domain (both under pressure, such with surgeons and the emergency room, but also doctors diagnosing disease). So a whole range of decisions in health care. Then you have policing. There you have frontline police, for example perception of risk and the decision to use force, which of course is a very hot topic in the U.S. with the shooting of young African-Americans. You also have the detectives who investigate crimes, and then also you have the forensic experts. There are also decisions of judges and jurors, jurors are not experts but there are in special role in making decisions. There are other domains, such as the financial world, where you have, for example, traders who invest money and buy & sell stocks.

I also work in branding and advertising. Here it is a bit different, in all of the other domains I mentioned, we want to help people to make better decisions, e.g., less medical errors, better policing, etc. However, in branding and advertising, they want to bias people, that is their goal. They want to bias people to buy the product, even (& especially) when the product is not great quality and it's expensive (relative to other produces in the market), but with the right branding & advertising, everybody's going to want to buy it because it biases them. In this work, it is about biasing consumer decision making in a bad way, and I feel a bit bad about it, but I have done some work in advertising and branding. The work there is about trying to understand what drives consumer decision

making and how to brand a product so people will buy it. You're not changing the product or the quantity, nor the price, just how you package it, the branding, and that impacts consumers' decision making.

I've also worked in other domains, such as the construction industry, on health and safety. In many domains you have an expert, and they perceive information, and then make judgments, decisions, and I worked in multiple expert domains.

**MCR:** OK and with this work would you say that you work mostly domestically or internationally?

**Dr. Dror:** I would say by far it's international. I do a lot of work in the U.S. and Canada but also in South America, Asia, Europe, and Middle East. Initially more in the United States and Europe, and only relatively recently in other countries, such as Singapore, Taiwan, Japan, China and Brazil. Such countries are still setting up forensic science on the basic level, and the cognitive issues and bias is the next step. That is in the forensic domain, but if we're talking about the medical domain, then it's all over the world all the time, from the United States, to the Cayman Island, to Australia.

**MCR:** Specifically, with the field of forensic science, when did you first kind of get interested in that?

**Dr. Dror:** Well I never got interested in forensic science, per se. It's kind of a coincidence. What happened was that I got an email from a fingerprint examiner who read one of my papers on U.S. Air Force pilots and then we talked over the phone. It sounded like there was a lot to talk about and he came to my office. Later he became my student and got a Ph.D. His name is [name omitted for confidentiality]. So he came to my office and I said, you know pilots, they have to identify other aircraft and to decide if they're enemy or not. And sometimes they're upside down and sometimes they don't see all the details. And I'm talking to him and he says, "Yes we do the same! We do the same in fingerprints." Until I said when the pilots are expecting an enemy plane to come from a certain location in the space, but then a friendly plane comes, then they are more likely to make a mistake because of their expectation. And then he says to me: "we fingerprint examiners are not affected by context." I could not believe what I heard, and I said to him: "what, what did you say?!" He repeated it: "We fingerprint examiners are not affected by context." I said, "That's impossible! Everyone is affected by context."

"No, we're totally objective" he said. So I said let's do an experiment where we manipulate the context and see what the data says. He responded, I remember it very clearly: "Dr. Dror you're wasting your time to collect the data because the fingerprint examiners are not affected by context."

So I said to him: "Entertain me, let's collect the data and see what it says." So we collected our first set of data and found, what was obvious to me, that they were be affected by context. He was shocked and turned in his resignation. He's been a fingerprint examiner for 23 years. I said to him: "Why are you turning in your resignation?" He said: "I've been trained that I am objective, not affected by context, I'm proud of my job for over 20 years, and now I find out that it is not the case..."; I said: "No, no don't resign it's not such a big problem." All we have to do is to acknowledge that we are humans. We have a brain. We have weaknesses, vulnerabilities and then we can overcome them.

People think I was happy to find bias in forensic science. No. If I wouldn't find it, it would be a much bigger finding, I'd get the Nobel Prize, it would be a revolutionary finding that some people are not affected by context. What I found is what you find in every expert domain when you have a brain you have certain cognitive processes that are impacted by context. So I was in a way disappointed that we found that fingerprint and DNA and other forensic examiners are biased, it only reflected that they're human. If we find that they have different brains than anybody else, that would be very big news.

**MCR:** In the article that you sent me from the Journal Forensic Science, there was a part of it in which you and the other authors believe that bias is impacting forensic science. Is that a fair statement?

**Dr. Dror:** Definitely it's impacting. But when I say it's impacting it doesn't mean they're necessarily reaching the wrong conclusions. So it's impacting the process not necessarily the outcome. So you can be biased but still reach the correct conclusion. It may still be negative because it may affect your confidence level. But it's definitely impacting. Is it affecting the outcome? Sometimes it does, sometimes it doesn't depending on different factors that determine that, but it's definitely affecting the cognitive processing. But you may still reach the same conclusion you would have even without the bias.

**MCR:** If you had to put a qualitative assessment on it. Do you think that it is impacting observations and conclusions made in forensic science often? Somewhat often? Rarely?

**Dr. Dror:** First of all, I'll try not to ask you what is rare and what is often because that's difficult. Two, when you say "impacting" do you mean the final conclusion or the process? Yes I would say it almost always impacts the process. Does it impact the outcome? I would say...impact in terms of reaching a different outcome, I would say not often. I would say that even if it doesn't impact the outcome it impacts the confidence in the outcome, which is not good. When they go to court, they may have more confidence in the outcome because of irrelevant information. And also even if it's not often, we should still do the best we can. The question is what's acceptable? So if we took certain domains, the medical domain, many many people die from medical error. More people in the United States (and the United States has good medical care) die from medical error than people who die from car accidents, AIDS and breast cancer combined. We accept such high numbers of errors. In aviation, on the other hand, we don't accept that people die. If one person dies on an airplane, it is a big deal. When some Boeing aircraft had a battery that was overheating, they grounded all the airplanes, right? So in aviation, society says that even when about eight million people fly each day, no deaths are acceptable. If every day one plane falls down and 200 people die, well 200 out of eight million, I'd fly, the odds are not bad! But that would be unacceptable, right? So what is acceptable or not is not only about how often it is.

**MCR:** Do you think that acceptance level would change given a state that allows death penalty versus a state that doesn't allow death penalty?

**Dr. Dror:** Yes I don't necessarily think for good reasons, because if you sit in jail when you are innocent for 30 years

because of flawed forensic evidence, is being executed worse? I'm not sure, I'd may prefer to be executed than to be in jail for 40 years. But there has been a case of someone who was executed based on problematic and disputed forensic evidence, the Willingham<sup>1</sup> case in Texas --there is a New Yorker article detailing the story. But I think society, not me, society views executing someone as much worse than sending somebody to life imprisonment without parole, like we have in California the three strikes and you're out, right? Someone has three felonies, that's it. But sadly we also get desensitized, even a year in jail is terrible. And I'm not talking about only taking your freedom away. I'm not talking that in jail you may get attacked or raped, but getting a job later with a criminal record, your family, etc. -- this is terrible, even being a year in jail (when you are innocent). Some people treat it as something mild, only a year in jail. I know there are people who go to jail many times, they go in, out, and in again, like a revolving door. But I think, and again I want to give the flip side, it's not only a problem of wrongful conviction of innocent people in jail. It's guilty people not going to jail for crimes they have committed. That's also terrible when someone is guilty, they committed a crime and they're not paying for it. And worse they continue to commit crime.

We need to get the job right as much as humanly possible. But I want to emphasize that errors in forensic science is not only about putting innocent people in jail. The opposite side is about not finding people who are guilty when there's good evidence, but the examiners wrongly determine that the evidence is insufficient for comparison. That is a bigger problem. They ask how many mistakes are made. Well whatever the number is, I can tell you that there are much more on this other way around, that is, more wrong decisions that evidence is unsuitable for comparison. For example, with fingerprints the cases when they say it's an identification when it's not, are more rare than cases when they say that the latent print doesn't have enough information, is insufficient to go to comparison, or they reach inconclusive decision, when it's actually an ID --this happens more often. It's relative. So we need to make sure that forensic examiners make the best decisions possible. And it's quite easy, all I'm saying is that they need to base a decision on the evidence and not based on irrelevant context and things around it. The experts in DNA and fingerprints and firearms they need all the task relevant information to make a decision.

**MCR:** A lot of focus lately has been on contextual bias and cognitive bias specifically within forensic science, but are there other areas of the criminal justice system that you feel that this could be applied to? And why do you think it is that it falls on the scientists in the field as opposed to the lawyers or the judge or the juries?

**Dr. Dror:** Good question. First of all, it's all over the criminal justice system in terrible ways. Let's not even start talking about white police officers shooting African-Americans. Although I have much to say about that if you're interested. Let's not even talk about judges who have prejudice and are biased. What about jurors? Who do you think jurors are? They believe people or don't believe people based on a lot of stuff. I have friends in the UK both of them are professors that specialize in human memory. And one of them gets invited to court all the time as an expert witness and the other one is not. And the one who is not invited, she's as good as he but she's

a woman and she's Indian and he's British speaking in some posh British accent. So they know the jurors listen to him they won't listen to a woman as much, and especially a minority woman. So the jurors are biased, the judges, the police officer. Everyone is. So why am I picking on forensic examiners? Well I'm not, I'm picking on everyone, for example, I have a paper on police officers on the perception of risk and decision to use force, and biases around that. I've been involved in a case in which a police officer shot a minority, and I worked on the police side because they didn't understand that the police officer --like every human--has limitations and cognitive vulnerabilities. They were going to charge the police officer not with manslaughter, but murder. After I got involved and wrote the report they didn't drop it to manslaughter but they dropped the charges against the police officer altogether.

Why is it so important to focus on forensic science, for two reasons: one, they're scientists. So I expect more. Jurors, judges, and police officers are not (and do not present themselves) as scientists. And two until recently you said you were objective and immune to bias. And sometimes even that you never make mistakes, that you have zero errors, that you are infallible. Claiming that is misleading to the criminal justice system and misleading to the court. Now, things are much better and the issue is more on the table and people acknowledge it and get training and take actions to minimize it. Now a third reason (number one was that you're a scientist, number two, you claimed that you were objective), and now number three: it's very hard to take the bias out of the police, jurors or judges. So the forensic scientists are the silver lining! The other ones are very hard to change. So the people who can keep the criminal justice system going the way it should go, are the forensic scientists. You have the potential to really keep things as good as they can be, and to do that we need to make sure that the bias is minimal in forensic science work.

**MCR:** I find it admirable that you believe that the forensic scientists are the silver lining. I think it's positive and encouraging but in that regard, it feels like a double edged sword...

**Dr. Dror:** It is.

**MCR:** Why is it that the burden of fixing the entirety of the criminal justice system, to make it more fair, less bias, falls upon the scientists when scientists are also human and not infallible? Judges for example, they sit where they sit because they're supposed to be the fair person in the courtroom. They're supposed to see all sides of it, hear all sides and they're the "gate keeper" in the courtroom, at least in the United States. So they have higher expectations. For me as a forensic scientist I feel like that responsibility should fall upon the judge.

**Dr. Dror:** It should follow upon the judge too. But the judge, the police officer and the juror, and the forensic scientists, you, are all human. However, you are the scientists, you have tools, scientific tools to keep you in line. The judge doesn't have any scientific tools, she doesn't have any scientific methodology, doesn't have the tools. You have the methodology, the science, you have the research, you have a lot of things to help you do a better job than the judge or the jury, or the detective, because you have a toolbox. You are a scientist. It's not because your brain is better than theirs, but you have





**We have weaknesses, vulnerabilities  
and then we can overcome them.  
People think I was happy to find bias  
in forensic science. No.**

*—Itiel Dror*

the science behind you. You have the research; you have the methodology, the tools, and the education. You have all that. Most judges don't have any of that. You know four weeks ago I trained all of the Superior Court judges in the state of Massachusetts. So I trained them about bias. And if you think the forensic scientists don't like to hear about bias, then the judges like it even less when you tell them that they're biased. But it's much harder for me to give them tools to minimize it. In forensic science, oh no problem! Linear sequential unmasking LSU, don't be exposed to irrelevant information, case manager, triage, compartmentalization, and more.

Judges are definitely biased, as well as the jurors, the prosecutor, the defense lawyer, and the detective. They all are, and as humans, you and I are also biased. But, forensic examiners, forensic scientists, when they do their scientific work it's easier for them to minimize or almost eliminate the bias because they have the scientific methodology. They can control what they're doing and they are also doing something very specific, examining evidence, not integrating different lines of evidence. The jurors, the judge and the detective, they get very different lines of evidence and have to integrate them—what eyewitnesses said, what the forensic scientist said, the suspect. There are a lot of lines of evidence and they integrate it, that is their job; but you're not integrating different lines of evidence. You're just looking at the DNA, or looking at the firearm, or the fingerprint, or whatever you're looking at. So there are many reasons why you can not be exposed to other information. When you integrate, the detective needs to know a lot of information, because they're integrating different lines of evidence. Are you with me?

**MCR:** Yes I am. So you're saying that forensic scientists have a greater expectation of success when it comes to implementing these safeguards because we already have a good foundation, good tools already?

**Dr. Dror:** Some forensic domains have better tools than others. But generally speaking there are tools and generally tools to do your science what you're supposed to do, for one. I don't think any tool in any forensic science says you need to consider whether the suspect confessed to the crime, right? It's not part of the DNA or the fingerprint tools, right? In the

fingerprint they look at minutiae they look at level two and level three and so on and so forth. So that's much easier. And you are able to adopt other procedures to minimize bias because you can control the context in the lab. What they know, when they know and they have a very specific job.

**MCR:** Why is it that you think, or maybe you don't think this, you can correct me, that labs aren't already doing that to the best of their ability?

**Dr. Dror:** Oh we know that they are not doing that. In many cases they don't do it and they say why they're not doing it. For example, a Director of a big forensic laboratory in the United States said, that his forensic examiners know a lot about the case so as to motivate them to do their job, because their job is boring and mundane. I say to give it to them after they finish. This is published material, it's not what he tells me privately, this is published in The Journal of Applied Memory and Cognition. Well he said, forensic work is very tedious and mundane and to many people just interesting enough to do the job so we have to give them the irrelevant contextual details. So not only are they not denying it, they're saying it. In some places the forensic examiner knows whether the suspect had a criminal record. That is outrageous in my view. Now it is important for the prosecutor and for the detective to know if someone is a suspect in a rape that they've been jailed for rape before ten times, then they're a serial rapist, that is very relevant and it gives information that they should follow the leads that this person committed the crime. But somebody who is a forensic examiner doing the DNA interpretation, shouldn't know about it. Same with firearms examiners, they don't need to know if the person who is the suspect has killed people before or their criminal record, race, etc. That is not relevant to the forensic examiner, and that's relatively easy to control.

I do want to say that now laboratories are starting to change. You have many laboratories that want to take this message on board. But they need training because they need to understand what cognitive bias is, understand the cognitive factors affecting how they work because many people still don't understand it. And I see that they talk about it under ethics, they think it's an ethical issue. That means they don't understand. They think that somebody is not motivated or that they are not honest. Cognitive bias has nothing to do with ethics it's how the brain works, and you know because you've heard me for 16 hours in my 2-day workshop on 'Cognitive Factors in Forensic Decision Making.' Many people incorrectly put cognitive bias with ethic, or things willpower can overcome cognitive bias. They need to understand a bit about it and the specific mechanisms how to minimize it, and then they can do something about it. This is happening, and more places are implementing more and more, but mostly after there is training and understanding of these issues. And California is quite advanced, but also other places in the U.S. and other countries who are implementing it. So it's much better but there's still a long way to go.

**MCR:** I have to say honestly that those scenarios that you mentioned before where a lab director was so staunch in his belief that we don't have bias. Or another individual who feels that they need to give the backstory to their employees because it's boring work. I've never encountered these situations in the lab that I work in or in labs that I know of.

**Dr. Dror:** First of all I don't want to talk about a specific lab, but I will tell you that it's very common.

**MCR:** Is it?

**Dr. Dror:** Yes. And I'll tell you two things, first of all there are surveys with data. So there is a survey of forensic examiners and most of them over 50 percent say that they are exposed to things like that. Two, I'll give you an example where I'm going to push the envelope a bit more. Do you want me to push it a bit more? You can take it? You do CSI work, right, crime scenes in the field? And I've joined a number of CSI teams in the U.S., including California, and in other countries. Almost every time, before they got to the crime scene, they were already briefed on what happened. So when they came to the crime scene they were already told what happened. Once they arrived, the police officer talked to them further, before they even had a look at the crime scene. They don't let them come to the crime scene and look around and have an open mind. So that also, I have now a workshop specifically for crime scene investigators. There was a case in California for example how it affected how they collected the evidence. When the detective said, "Well you know I think it's not a suicide it's murder" or "I don't think it's burglary, I think it's insurance fraud." (when people take all their stuff, give it to their friend and pretend somebody burglarized them and they then collect money from insurance), that all impacted the CSI people and what they did at the crime scene. I'm not saying you can't tell them those things but they're told all of this before they even get to the crime scene.

When I get involved in a court case, and I get involved very rarely, and I've done them for the prosecution and for the defense. The lawyers want to brief me on the background. I say take your briefing and take your background information, and keep it to yourself, I don't want to know. Don't brief me. Don't tell me what the case is about. Give me the specifics, limited to what I need to know. You want me to look at potential bias by an expert, so just tell me what bias, what expert. Don't tell me the background and anything not relevant to what you need me to do. That's how they start, with the background. Trying to put me in a state of mind to manipulate me.

So that's an example. Now in CSI it's a bit more complicated because you need context to know what you're doing. But there are certain ways where you don't have to give them the theory of what happened before they even get to the crime scene. To give them a bit more freedom of mind to develop their own ideas to look at the crime scene and have their own un-influenced impression before you give them the information. You give them all the information, it's about the sequencing. That's what linear sequential unmasking (LSU) is all about. What you know, and when. And here we're talking about CSI, and you tell me (or don't tell me), but I would be willing to bet that always (I will be more careful and say almost always, but I believe always), when you go to a crime scene they tell you what's happening before you get there. They do not let you get there, let you look at the crime scene make your own mind, based on the data, and then tell you their theory of what happened... Sometimes they tell you more than that, they tell you not only what happened, but what they want you to find, who they want you to identify. You know it goes to a different level every time. So the question is how do we let experts, CSI, forensic people, police detectives, judges,

jurors, medical doctors, surgeons, nurses, bankers, pilots, military, make better decisions and that's what I try to do.

**MCR:** I think that's fair. But specifically when it comes to say this briefing, the CSI briefing...the way that you make this statement, it seems almost as if the criminalist who's responding to the crime scene... You're not giving them credit in terms of being able to discern what's relevant what's not—the information that's being told to them, whether it's relevant or not.

**Dr. Dror:** The crime scene investigator can determine what's relevant or not. But once they are exposed to the irrelevant information it impacts them. Because if they hear it, they can't ignore it, they can't by mere willpower control it. So that's a second misunderstanding about bias. One, it's an ethical issue. That's incorrect. The other one being that people believe that if they're aware of it, they can control it by mere willpower. You can't. Once you're exposed to the information, you can't block it out. So once you get the information, so when you come to the crime scene, they brief you and they know this is relevant, they know this is not relevant. But what they were told that was irrelevant, they hold it, it's in the brain and it changes how the brain processes information.

**MCR:** But why can't that information just be considered a testable hypothesis?

**Dr. Dror:** That's what they want it to be. But I don't want them to go backwards from the hypothesis to the data. What I want them to do is to come to the crime scene, I want them to develop their own hypothesis on what happened before they get their briefing and then I want them to get the briefing and then I want to see if the hypothesis that they came up from the crime scene, without the briefing, fits the briefing and if it fits the briefing, that's great. If it doesn't fit the briefing, then you ask why. The same thing in the medical domain. The medical domain has the same problem, why? If you go to the hospital, before you see the real doctor, you saw the nurse, the medical student, the junior doctor, they briefed the doctor before she sees you, before she talks to you, and they are already in a state of mind of what you have. In the medical domain, it's very common in California, it's called SBAR. The real doctor knows the Situation, the Background, Assessment and the Recommendation before they even see the actual patient. That puts them in a state of mind. I want them to do the following- revolutionize medical domain. I want them to come and talk to the patients and examine the patient for two minutes, not long. I don't want them to know the background. I don't want them to know the family history. After they examine the patients for two minutes they have ideas what's going on, e.g., that they're having a stroke. And then they get the family history. Then they hear the family history and everybody dies from stroke, then that fits well. But if everyone dies from a heart attack, then I want them to think and consider both. So the initial theory, I want it to come from the patient themselves, from the data, not the background. People who have diabetes, for example, they don't like to go to the emergency room, you know why? Because they say the minute they say that they have diabetes, then no one listens to them anymore, they put everything on the diabetes.

The CSI needs the background, the doctor needs your medical history, your family history. But don't give it before

**...the generation before you, said things that were outrageous. "We're infallible, we never make mistakes," and they kind of asked for it in a way. And now you're getting a backlash...**

the patient, give it in the right order. What you want is similar to linear sequential unmasking (LSU), you want the evidence to drive the cognitive processes, not the suspect. Not the theory. You're not to start with a theory or a suspect, and then go to the evidence. You want to develop the theory from the evidence.

**MCR:** I feel like most people in the field would say that that's what they're doing.

**Dr. Dror:** But, before they come to the crime scene they are exposed to a theory. And even though they try to block it out, it impacts how they look at the crime scene. If they didn't hear any briefing they would see the crime scene like children. Children ask, you know, the best questions. So you want to have that initially. But again you know in a small article that you're going to write for the *CACNews* we're not going to be able, or you're not going to be able to get to enough depth and I don't know if you want to mention it because it's so complicated that it sounds unreasonable unless you see all the examples of how things happen and get some understanding of the human brain and cognitive architecture. A two-day workshop is a big step forward, but even then, we're only scratching the surface.

**MCR:** I feel like the most contentious point is how much information should the criminalist know on the front end?

**Dr. Dror:** I have an answer that's not contentious, I say the criminalist needs to know all the relevant information. What is relevant or not, only the criminalists themselves can decide. They need to know everything they need for doing their analysis, but what they don't need to know things that are task irrelevant. Sometimes you can't avoid it, but as much as possible if it's irrelevant they don't need to know it. That is one, and everyone will agree with that, I hope. And two, what they need to know, I want them to know it as late as possible. So if you're doing some kind of process whatever it is, and in Stage 5 you need to know some information, get it when you get to stage 5 don't get it in the beginning all what you'll need. As and when you need the information, give it, so you give it as late as possible so it doesn't impact the stages before. Is that reasonable?

**MCR:** Yes, that absolutely is.

**Dr. Dror:** That's linear sequential unmasking (LSU).

**MCR:** I feel like, though, to a certain extent, that is what happens at a crime scene because often times, the criminalist is driving the questions. The criminalist is asking the relevant questions.

**Dr. Dror:** But that's once at a crime scene. But before they get to the crime scene they can't ask anything, but they're al-

ready been briefed and told information that they don't need to know right then and there.

**MCR:** I think maybe that's just the differences from lab to lab because for my laboratory we have to have a certain amount of information to determine whether or not we're going to respond.

**Dr. Dror:** And not only that, I will even help you. You need to know whether to respond or not, you need to know which equipment to bring. And yes I've been there and done that. So I understand.

**MCR:** So we ask the questions we don't just let them tell us stuff. We ask very specific questions because we take a request. So they call us. And then we immediately say, "OK you're placing a request, these are things I'm going to ask." And they start asking questions...

**Dr. Dror:** But when you come to a crime scene don't they say, "Let me tell you what I think happened here." It happens.

**MCR:** It does but often times...

**Dr. Dror:** In some jurisdictions more than the other, I will agree with you. But I don't blame the detectives, you're here and they want to tell you what's going on and whatever. That is a problem. That's part of the problem.

**MCR:** Yeah and I guess in my personal experience a lot of the times they just, they're waiting for you to just show up. And then as soon as you arrive, the criminalist is really driving the briefing. Yes, I'm having a briefing with a detective, but I'm asking what I believe is relevant to me at that moment. I start my search, I come up with a processing plan and then I let the evidence start guiding me to additional questions.

**Dr. Dror:** I have no problems with that if you are the boss, yes. But often the detective you know gives a theory, but look at DNA, you are an expert in DNA, and that paper with Bruce Budowle<sup>2</sup>, I will send it to you so you can see the details. We are really pushing that the DNA examiner will not see the profile of the suspect until they fully developed the profile for the biological material in the crime scene. Because many times, maybe not in your lab, they go backwards they develop the profile from the crime scene at the same time or even after they have a DNA profile for the suspect and that impacts how they calculate dropped alleles, calculate the likelihood ratio, impacts the interpretation.

**MCR:** OK. Because we actually have two different analysts that do that. One analyst works only on the evidence one analysts only works on the references.

**Dr. Dror:** And that's perfect.

**MCR:** And then we have a third analyst who does the reporting.

**Dr. Dror:** That's fine. That's good.



**MCR:** We always separate; I guess that is our attempt. Maybe it's not the best, but it is our way of limiting the information.

**Dr. Dror:** It's very good. And even if it's not good the fact that you're attempting is excellent. But there are many places, around the world and in the U.S. and in California, who do not do that.

**MCR:** All right. So you've been generally speaking about forensic examiners, have you found that there are specific disciplines where there is maybe a higher propensity or occurrences of cognitive bias versus others?

**Dr. Dror:** Definitely. But, other places other domains, it depends more not necessarily only on the forensic discipline, I think it depends if they're sworn officers or not. There are places where its just sworn officers, there are places where they work for the prosecution. For example, in California there are forensic laboratories that are not apart of the police department, they're apart of the prosecution. And there are places where they're independent bodies, there are places where they are commercial and there are other pressures on them. It's not a one way or the other.

**MCR:** So it's not so much the discipline, but maybe it has more to do with the type of laboratory or the type of analyst?

**Dr. Dror:** That's right. And the discipline, the discipline also plays in with it. And not necessarily in a negative way but some disciplines are more objective. Like toxicology and drug analysis, and some different disciplines are more subjective. Like handwriting comparison, and others.

**MCR:** Do you feel that you want to help enhance the field of forensic science? Or what is, generally, your personal goal?

**Dr. Dror:** My personal goal is to enhance forensic science, definitely. And in both ways—to minimize error in the sense of false identifications, but also to reduce error of false negatives when they say inconclusive or insufficient and they are able to make a decision. So I want to increase the quality of decision making. And one of the ways, there are other ways, is to minimize bias. You know bias has received a lot of attention right now not because of me, but because of two reasons. One, the forensic examiners climbed up that tree by saying they're objective and they are immune to bias. So they were kind of asking for it, yeah? They made it into a big deal. And two, because of the Brandon Mayfield<sup>3</sup> [case] where the FBI made an erroneous identification and it was investigated by the Office of Inspector General. And they concluded that the erroneous I.D. was in part due to confirmation bias. Which is why people talk about confirmation bias. But there's motivation bias, base rate bias, suspect/target driven bias, etc. A whole range of biases, but the focus in forensic science was on confirmation bias because of the FBI Mayfield case, the Office of the Inspector General said it's confirmation bias that contributed.

**MCR:** So, would you prefer that the field of forensic science see this less in terms of bias but more so improving decision making?

## **You're not to start with a theory or a suspect and then go to the evidence. You want to develop the theory from the evidence.**

**Dr. Dror:** Yes. One, what was the title of my workshop? The word bias doesn't appear. Sometimes it does. Some laboratories would say "we want training on cognitive bias", but it's cognitive factors in forensic decision making. Two, bias is a part of it but it's not the only part. We have parts on how to select people who have talent to do this job, and also how to train people effectively. There are many issues. Often I don't call it bias, I call it cognitive contamination. I don't use the word bias because they're very aware of physical contamination, right? They're really aware of it and they take huge steps to minimize it, and when I say look, look you know about physical contamination, why don't you consider cognitive contamination? That's a bit more palatable, but that's more the branding and advertising of selling it so they don't get defensive because they don't understand the term bias.

**MCR:** I think a lot of the readers of the *CACNews*, which are practicing and retired forensic scientists, think there are two schools of thought with respect to the laboratory model. One model is the testing facility and the other model is the more, I guess you would say, whole body of work crime lab. Where the differences lie in the fact that at a testing facility you would have less information about cases you're less involved in the decision making on behalf of the investigator. You are just doing your protocols. And the other model is that the criminalist should be helping the investigator, guiding the investigator. They should be aware of all information because they need to make more educated and better decisions because they're better informed.

**Dr. Dror:** They're not better informed, they're informed about irrelevant context. There's two questions. First question is how do you identify? Do you identify yourself with law enforcement? Or with science? And I would like forensic scientists to be more into the science. They don't make better decisions, they have what I call the Sherlock Holmes syndrome. It's like *Quincy M.E.* If you want to be a detective, I have a lot of respect for detectives, go and be a detective. But if you're a forensic scientist specializing in firearms you do the firearm [analysis]. You don't know and don't get informed about eyewitnesses or all the other information. The question is what do you want to do? And you are not here to fight crime. You're here to provide scientific support to the people who fight crime. And to do justice. Two, I think that you would help justice more by not trying to help the police, but by just doing your scientific work.

**MCR:** I personally don't feel like I'm fighting crime... I don't think that's what we're doing in the laboratory.

**Dr. Dror:** But doing good science you are doing that and you're doing it better than those who are trying to help the police. You want to help the police really well? Then don't talk to them and do the scientific work and that would help them

more than talking to them and saying, “what you need to do...” and “here, I’ll try to help you,” or whatever.

**MCR:** I think that the individuals that feel like the holistic crime lab model is better, they do regard themselves as scientists and they are in the true sense, they are scientists. I think it’s not so much assisting the police or serving justice, if you will, it’s more that what they see is this movement of incorporating human factors as being one more layer of restriction. That lawyers are trying to control science and that ASCLD ISO and all of these accrediting bodies are trying to control scientists.

**Dr. Dror:** It’s the opposite if it’s done properly. It could be that they’re using you know ISO or whatever to do that. But right now, I gave a talk and the title of the talk was “Science in the Courtroom,” rather than using science, science is misused and abused. So science needs to be used in court but often it’s misused and abused because of the lawyers and the adversarial system. And the adversarial system is really, really, really bad and it’s very hard to do science and to work to do science within the adversarial system. That’s a very, very big problem. And I totally agree with you. But the question is how to do science within the adversarial system and not to constrict them. Now the point that I will give you and solve, is that you may only be doing science but the police and the lawyers, they don’t know what needs to be done. They don’t understand how what you did relates to the case. So you need to know a lot of information to decide what to do, what’s relevant? What else to do? And then when you have the results then you need to communicate it to the detective and to the prosecutor so they understand how it relates to the case, yes? There is a new paper out now of someone who has been researching that where the police detective says, “I don’t even understand the report. I have to call the forensic examiners.” So the solution to that is what I call the case manager. So the case manager knows everything so they know all the context and then they can decide what tests to run and what tests not to run, how to run them and prioritize what’s relevant or not. But they don’t do the actual forensic comparisons. And then once there are forensic results then the case manager communicates it to the detective and the lawyers and explains to them what the results mean in terms of the case.

**MCR:** Going back to the subject of accrediting bodies which are now including issues like cognitive bias, contextual bias, all these human factors... To most scientists in the field that like this holistic approach where they feel like it is their domain to control that information, they feel that this is just one more way of controlling them, pushing them into a box. These are your protocols you shall follow these rules. And the scientist is losing the ability to truly be a scientist...

**Dr. Dror:** It’s not only ASCLD ISO it’s all accreditation, proficiency testing. People always ask me if I’m for proficiency testing and accreditation. I say yes if it’s done properly, it’s better not to have any proficiency testing or accreditation if they’re not good and they’re a pain and don’t contribute—if people spend time, money and resources accrediting the lab and it doesn’t improve performance? So all this oversight can be great or it can be the worst thing ever to do for forensic science. The question is, do they do it properly or not? That’s the question, they can restrict the scientist, it can ruin the science,

it can ruin the profession or they can do it well by giving the scientist the tools. So that’s up to them how they do it. I’m not apart of that but I can say that, for example, in linear sequential unmasking, the title of the paper is, “Linear Sequential Unmasking: Toolbox.” So it’s a tool and we want to provide the tool box for different tools to control context to minimize bias and then you need to decide if you need a tool and what tool you’ll need. So sometimes you need a hammer sometimes you need a screwdriver, sometimes you need neither one. So what I’m developing is a toolbox. I’m not telling you what to do, I’m not making standards for accreditation, I’m developing a toolbox in this area and then you as the scientists need to decide if and what tool you need and when. And you, you’re the one. That’s why I like talking to practitioners and not to the generals; I like to talk to the foot soldiers who are actually doing the work.

**MCR:** But you do realize that we’re not the ones that make the decisions for the laboratory?

**Dr. Dror:** Yes, I also talk to the generals. You don’t make the decisions, but you’re the people in the field who actually do the work and know how you do the work. You know, the medical domain 70 percent of the time they don’t go through the checklist, right? The management has a checklist but some things you can or can’t do. And sometimes you can go through the protocol and go through the motion and tick boxes but then you’re not really doing it, just going through the motions. So I want the forensic examiners, the foot soldiers, to be onboard. That’s why I like training them so they understand the concepts and can do it, and many of them do stuff and they’re not using the protocol. They say I don’t want to look at this, even though it’s not in the protocol, because they understand. So this is why we need them to be onboard.

**MCR:** I think the fear with this is that we’re just scraping the surface. How far do we go? Who gets to say that we’ve successfully implemented your toolbox.

**Dr. Dror:** How far to go? Go all the way and from my point of view the people who make the decisions are the practitioners. They decide what’s relevant or not relevant. But they have to justify it. They cannot say it’s relevant, because they feel like it, they need to decide. So I was in China recently and this DNA examiner says to me, “I need to know everything.”

“Maybe you do, I’m not here to say not, I don’t know, I’m not a DNA examiner,” I said. You need to explain why you need everything. He said: “Why, I need to know this because of this and I need this because of that and this affects my work in this way.” Great. It’s up to the practitioner if he needs to do that and you need to decide. Also, and I say it in my paper, and in the workshop, not to ‘kill a fly with a canon,’ not to overreact, right? And people have taken my research and overreacted, because they don’t understand what I’m talking about, and it is misused in the adversarial system. That’s where the prosecution got me involved in cases because the defense is using my stuff not the way I intended and misrepresenting me and the defense gets really angry because I appeared on the prosecution side saying the defense is citing this and this and this, but that’s not what I’m saying and they’re mis-citing me and the defense was very angry. As long as the forensic examiners understand the issues, as long as they are not defensive, I have no problem with what they decide. One, I don’t

have time to decide for you, even if I wanted to I have better things to do. But I want to expose you to the concept, and to understand the issues, and then you can decide if, when, what needs to be done. In my paper I say you need to decide when it's needed and what is proportionate and appropriate.

So you can say yes, there's a problem here, but the problem is small and to solve it we need to do this, but it's not justifiable, it's not proportionate, it's not appropriate. Who decides when it's needed and what's proportionate and appropriate? The forensic examiners! I can't, I don't have time. I'm not motivated and even if I had time and I was motivated I don't know, I'm not a forensic scientist. So I cannot make the decision but you need to make the decision out of understanding and not, "I'm objective. I never make mistakes, I'm God Almighty and leave me alone." That's not accepted anymore. And I think part of the problem that you are afraid of, that you have all this backlash is because, not you, but the generation before you, said things that were outrageous. "We're infallible, we never make mistakes", and they kind of asked for it in a way. And now you're getting a backlash, and it's supposed to be in the middle but now it's going this way and they don't trust you to make decisions because when they trusted you, the profession abused it in a way. Look at the FBI and hair analysis, right? They went to court and said things that were totally not true. They said: "one out of ten thousand." And now they are investigating, only to find that they sucked the number out of thin air. There was no data, they invented it.

**MCR:** I think all of us are angry at that.

**Dr. Dror:** Yeah, but the problem is now you have to lay in the bed the way they made it. And that's where you're afraid and you're justifiably afraid but that reaction, now when you say a number, "where do you get that number?" They're a bit skeptical. I understand your fear, you've been naughty and now you're getting punished but not you, you weren't naughty the generation before you had, and are retired now and left you to face it. I think the previous generation climbed too high on the tree and now you have to go down. I said to examiners, the same thing I said in your workshop, every science, not just forensics, chemistry, physics, biology, every time we do something, there's always limitations. There's always weakness you have to say in your report, here are the limitations, here are the weaknesses, it's a standard, but you are afraid because it's adversarial they'll use it against you. But I think that with openness in discussion and training, things are changing quite a lot. And I do quite a lot of training in California, which is a good sign for California, I believe.

**MCR:** That makes me happy, being a practitioner in the state of California and also on the CAC Board. But in general though, going back to this concept of, I heard this in the workshop that it's for the practitioners to decide when it's needed and to determine what's proportionate and what's appropriate. But, you, I don't know if you realize this but there are organizations like the National Academy of Science and the National Institute of Science and Technology, there are these other entities that are really driving, some for better some for worse, these types of restrictions or standards. And it's not our voice it's their voice. They're well intended. But..

**Dr. Dror:** I even sat on some of those committees. Well the way to hell is paved with good intentions, yes? So many

of these committees have many practitioners inside of them, so NAS didn't, but let's say the NIST working group of fingerprint examination that I was on, was mainly, by far, made out of practitioners. Now it's very funny the situation today, that different states in the United States, or different places in the same state, do things totally different. Training, standards, etc., and then you get different results, which is a bit interesting, right, and funny.

**MCR:** No it's not.

**Dr. Dror:** If you take DNA in New York, the five boroughs. Some of them use TrueAllele some of them don't use TrueAllele, so it depends in New York where I commit my crime the DNA result is going to be very, very different. That is not very scientific. And in the United States if I want to cut hair, I need to get a license and there are certain requirements about how many hours I need to practice, but in forensics there aren't such standards. Whether it's fingerprints or DNA, some states you have this amount of training. Some states you have that amount of training. It's varied, so they're trying to ask what is the right amount of training, what is the right standard and the standards shouldn't be too rigid. We don't say this is what you have to do, you know, we say this is what you need to consider. That's the language we use, the lab should consider this, the lab should consider, the practitioner needs to consider, because it's not one size fits all, it depends on so many factors. So the standards need to be written in a way that the practitioner adjusts and implements them to a specific case, but out of understanding not out of defense and the belief that they never make mistakes. Then we're not getting anywhere.

**MCR:** I think most of us in the field are receptive to these standards. I agree. I think it should be standardized. There should be a minimal expectation of the quality of a Criminalist when they go to court, an expectation that they had this much training and experience before they could actually be considered a true expert, right? I agree with them in that regard. But where I think there is a disconnect is that it is starting to feel more and more that these bureaucratic groups are just saying you should do these things, but there is no follow up. How do we implement these things? Where is the support for these changes? Where is the funding for the training?

**Dr. Dror:** We are on the same page. If you get a drivers license, if you're going to drive a car you need to get a license, you need some kind of testing to determine that you're able to drive, right? So if you're going to go to court and present evidence and it's going to send somebody to jail, you better be able to do it properly. Now the fact that the bureaucrats and the lawyers can come in and ruin everything, well that's true. But the question is how to do it properly? I agree with you, it needs to be done properly. Many things are done that are not feasible. Like the example of passwords that I explained in the workshop, right? So the bureaucrats tell you, you have to have a password and you have to have at least eight characters and two uppercase and one lowercase and they say don't write it down. But how can I memorize all that?! And then they also say don't use the same password for different accounts. You know it sounds good but it's just not feasible. You know they give you safety instructions for a machine they give you 20 pages of safety instructions so you don't sue them, they don't



tell you what you really need to be careful. They distort it and make it unreasonable. But hopefully that will not happen in forensic science where the lawyers will come in and the bureaucrats will make standards and guidelines that should make the domain better, but they will make it so your life is miserable and more terrible.

**MCR:** So going back to this question, how do we as criminalists employed by public agencies...

**Dr. Dror:** But we agree. We totally agree. On the one hand we don't want stupid rules that restrict. On the other hand we don't want every criminalist just does what ever they want. Chaos like the jungle, there's no standards, no training no anything. How do we move this forward but don't get it the wrong way and have the proper standards is a very good question. I'm just bringing attention to things that are not working in the forensic domain. Whether the practitioners take it on board or whether the bureaucrats make it miserable, is not in my control. All I can say is that the practitioners can avoid the bureaucrats if they take it onboard voluntarily. If you wait for the Mayfield cases, and you then resist, it's going to come down on you and not only by the bureaucrats by the judges and the courts. There's a saying in English, I don't know if it's in American English: "Take the medication before the disease." So if you take it onboard proactively, then good. But if you wait for the Mayfield or another investigation where you screwed up, there are repercussions. But I'm not apart of those repercussions. So what's very, very practical for the criminalists even if they are afraid, let's adopt and impose the anti-cognitive bias tools and deal with it properly. Then you can say you're already dealing with it, you're already onboard.

**MCR:** I think that's the hope that all laboratories have and they do this by accreditation and through audits. Your lab is audited by your peers, other labs see what your processes are and they basically scrutinize and...

**Dr. Dror:** That can be great and it can be a waste of time and a rubber stamp depending on how it's done, right?

**MCR:** So it sounds like your suggestion would be to just become early adopters? To start trying to find ways, recognize it first of all, acknowledge it, and try to find ways to start small and start minimally implementing protocols to try to make us better decision makers.

**Dr. Dror:** And see what works, what doesn't work, what requires more effort. Determine what requires this effort. So you find what works for you in your lab. Yeah, that all I want and even if you don't do it, that's okay with me as long as you consider it and think about it. If you consider it and think it's not a problem, that's fine. But really think about it not out of, "Oh yeah I thought about it, it's not a problem." That's all I want you to do. What you conclude and what you do or don't do about it is, I'll say it politely and less politely, politely- it's up to you. Less politely—it's your problem not my problem. But all I want you to do is not say, "Oh we're not affected." I want you to understand the problem and then decide if and what you need to do about it. That's what I say in my papers and in my workshop. Listen and think about it and then decide, but do it out of understanding and not out of ignorance.

But it is hard for your readers to consider unless they get the training and understand what cognitive bias is. Understand what selective attention is, what chunking is, or top down processing. Things that you, hopefully, remember. It's hard for them to take a measure before they really have an understanding of the issues.

**MCR:** My goal is for them to, maybe, want to understand. Kind of like: "I haven't thought about this. Maybe this is something I should be trained in."

**Dr. Dror:** If you're happy, I'll email you the link the to cognitive bias web page. That has the articles and videos and solutions if they want to read more they can do something about it if they want to, including training.

<http://www.cci-hq.com/forensic-identification.html>

#### (Endnotes)

- 1 <https://www.innocenceproject.org/cameron-todd-willingham-wrongfully-convicted-and-executed-in-texas/>
- 2 Strengthening forensic DNA decision making through a better understanding of the influence of cognitive bias. A.M. Jeanguenat et al. *Science and Justice*. 57 (2017) 415–420
- 3 <https://oig.justice.gov/special/s0601/exec.pdf>



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# The Bias Snowball and the Bias Cascade Effects: Two Distinct Biases That May Impact Forensic Decision Making

Itiel E. Dror, Ruth M. Morgan, Carolyn Rando & Sherry Nakhazadeh University College London (UCL)

Seven different potential sources of bias are presented in Figure 1. They include innate sources relating to the mere fact that we are human (the very bottom of the taxonomy), general sources that emerge from the experience, training and environment in which forensic examiners operate, and also the specifics of the case being investigated (the top of the taxonomy, that includes the improper biasing use of reference material as 'targets' that drive the forensic comparison – i.e., working backwards from the suspect/target to the evidence, rather than the other way around; see [1,2] for details). Official bodies, such as the UK Forensic Regulator [3] and the US National Commission on Forensic Science [4], have now acknowledged the potential of cognitive bias in forensic work.

However, the question remains as to the mechanisms of how such sources translate to actually cause bias. Here we should distinguish between the bias cascade and the bias snowball effects.

Consider, for example, that in some jurisdictions the CSI personnel that collect evidence from the crime scene are the same people who also do the forensic work back in the laboratory. In such cases, the analysis, evaluations, interpretations and conclusions at the forensic laboratory may be influenced by irrelevant contextual information that examiners may have been exposed to at the crime scene. It is not always simple and clear what information is relevant and what is irrelevant, but

clearly there are many pieces of information that are totally irrelevant to the forensic examiner (see the National Commission on Forensic Science document, "Ensuring that forensic analysis is based upon task-relevant information"[4]). The *bias cascade effect* is when bias arises as a result of irrelevant information cascading from one stage to another, e.g., from the initial evidence collection to the evaluation and interpretation of the evidence [5].

The bias cascade effect can take many forms, all sharing the characteristic that irrelevant information in Time 1 (e.g., during evidence collection at the crime scene) cascades to Time 2 (e.g., when the evidence is interpreted). Countering such bias cascade can be achieved by controlling the information flow between the different stages of the forensic investigation [2,6,7].

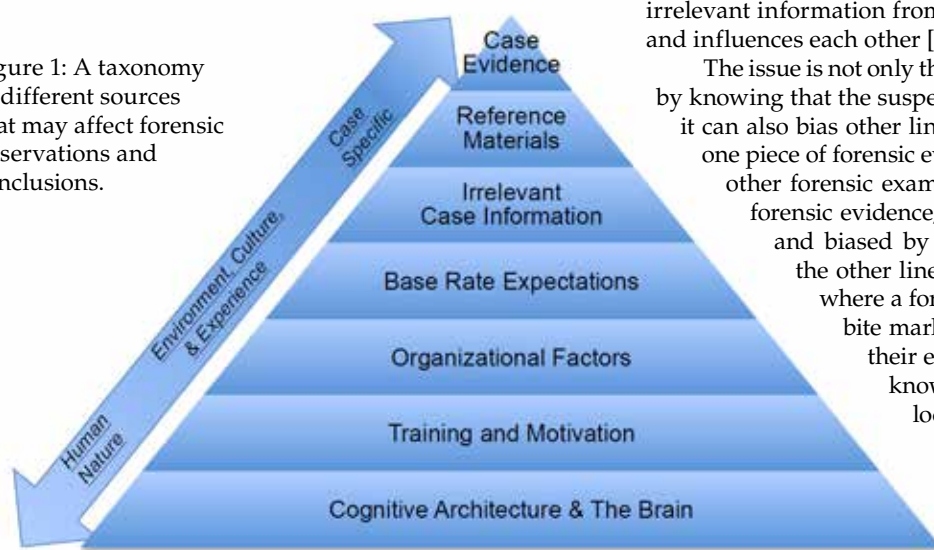
First, it is best to have different people involved at the various stages of the forensic investigation. For example, it is ill-advised that those who collect evidence at the crime scene (who are exposed to a variety of contextual information, much of it needed to do their job), will be the same people who examine and interpret the evidence back at the forensic laboratory (where the initial information from the crime scene may be irrelevant, and potentially biasing, for the laboratory work).

Second, people at the various stages of the forensic investigation should determine which information is relevant and needed for the next stage. They will only convey that information while isolating any information that is irrelevant. This segregation approach allows the control of the flow of information, and to optimize three factors: what information is provided, when it is provided, and who are the right people to provide it to (the case manager, the context information management, and the Linear Sequential Unmasking (LSU) approaches all fit well within this framework, [2,6,7]. In the example above, the CSI will convey with the evidence only the relevant contextual information needed. The point here is that without such measures, irrelevant information and bias can cascade from one stage to another.

The *bias snowball effect* is quite different than that of the bias cascade effect. With the bias snowball effect, bias is not only cascading from one stage to another, but bias increases as irrelevant information from a variety of sources is integrated and influences each other [8-11].

The issue is not only that forensic work can be biased (e.g., by knowing that the suspect confessed to the crime), but that it can also bias other lines of evidence. For example, when one piece of forensic evidence (biased or not) is known to other forensic examiners who are analyzing different forensic evidence, and their examination is affected and biased by their knowledge of the results of the other lines of evidence. Think of a situation where a forensic examiner who is looking at a bite mark may be influenced and biased in their examination of the bite mark if they know that the DNA found at the bite location was matched to the suspect. The bias snowball effect is not limited to forensic lines of evidence; for example, an eyewitness may be influenced by knowing about evidence implicating the suspect, and in turn, the eyewitness evidence can influence the interpretation of other evidence.

Figure 1: A taxonomy of different sources that may affect forensic observations and conclusions.



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When different, and supposedly independent, lines of evidence (e.g., bite mark and DNA evidence) affect and influence one another, then their value is diminished. Additionally, this cause double counting of the same evidence; for example, when the bite mark examiner is exposed and influenced by the DNA findings, then the DNA evidence is counted twice: once indirectly and implicitly through the bite mark evidence, and then again, directly and explicitly when the DNA evidence is presented [8- 11]. Part of the problem here is that forensic examiners are integrating different lines of evidence, rather than focusing on their domain of expertise, doing their analysis, and leaving the integration of evidence to those who should be doing it (e.g., the detective, the jury, or the forensic case manager [6]).

In the bias snowball effect, as one piece of evidence influences another, then greater distortive power is created because more evidence is affected (and affecting) other lines of evidence, causing bias with greater momentum, resulting in the increasing snowball of bias.

The bias cascade effect is therefore quite distinct from the bias snowball effect. As we move forward and work to enhance forensic work, it is important to gain better understanding of the different sources of bias [1], different mechanisms in which the bias may operate, and to be able to assess if and when bias may impact forensic observations and conclusions. To achieve this, a holistic understanding of the forensic reconstruction process may be beneficial. Appreciation of the full forensic science process from the crime scene through to court, as well as how and where different types of knowledge (both explicit and tacit) are generated, and then interact and contribute to evidence based decisions (such as Morgan's conceptual model [12]), offers a framework for moving forward.

The forensic community has taken major steps in addressing the potential for bias, and further insights into various forms of bias can help consider if and what further steps may be needed.

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# Transformational Forensics

Ron Nichols

Forensic science is defined as, “the application of scientific principles and techniques to matters of criminal justice especially as relating to the collection, examination, and analysis of physical evidence.”<sup>1</sup> That definition has served the profession well, showing how the forensic scientist is focused on evidence and what it can tell about the commission of a crime. The forensic scientist was the one who would help the evidence speak for itself without regard to which of the two sides, prosecution or defense, that it favored. It was through forensic science that the truth with respect to a crime scene would be revealed.

Early on, forensic scientists were intimately involved in the investigations as they took place. As time progressed, they became increasingly isolated to the point now where some recommend for the complete separation of forensic science from any part of law enforcement. Where once forensic science may have been more of a collaborative effort on the part of investigators and scientists, it has become a completely scientific enterprise, housed in sterile laboratories, figuratively if not literally. Investigators are pretty much kept at an arm’s length. It seems like laboratories have forgotten, or maybe chosen to ignore, that there are faces to the crimes they help investigate.

This is being written the day after the most recent school shooting in Parkland, FL. As of the morning of the 15<sup>th</sup> of February, seventeen have been reported killed and fifteen injured by a single gunman. It’s actually pretty sad when school shootings are discussed in terms of being “most recent.” But that’s what it has come to. Prior to the Parkland shooting there was one in Kentucky on January 23<sup>rd</sup> in which seventeen stu-

	2014	2015	2016	2017
Total number of incidents	51,881	53,703	58,780	61,497
Total number of deaths	12,569	13,501	15,079	15,590
Total number of injuries	23,013	27,039	30,615	31,181
Children (ages 0-11) injured/killed	607	696	671	732
Teens (ages 12-17) injured/killed	2,332	2,695	3,125	3,234
Percentage youth (0-18) injured/killed	8.2%	8.3%	8.3%	8.4%

Figure 1: Firearm-related violence in United States, 2014—2018.

dents were injured and two were killed. It’s disheartening when the print is barely dry in the news reporting one school shooting before the next occurs. These shootings not only get the attention of the press, they also garner the attention of the public, sports figures and politicians calling for increased gun control legislation.

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2. Berkowitz, B., Lu, D., and Alcantara, C. The Terrible Numbers that Grow with Each Mass Shooting. The Washington Post, December 14, 2012. Last accessed February 15, 2018 at [https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/?utm\\_term=.5cd2eb7128b1](https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/?utm_term=.5cd2eb7128b1).

3. [www.gunviolencearchive.org](http://www.gunviolencearchive.org). Last accessed Feb. 15, 2018.

Since 1966, there have been 1,077 individuals killed in mass shootings, defined as shootings in which four or more have been killed by a single shooter<sup>2</sup>. They are tragedies in every sense of the word and the attention that they receive is appropriate. At the same time, what seems to fall through the cracks are the daily incidents of gun violence that plague America. Figure 1 shows a summary of firearm-related violence since 2014, through 2017.<sup>3</sup> As tragic as the mass shootings are, when the statistics are examined for the last four years, it is readily apparent that tragedy exists on a daily basis. Figure 2 is a graphic illustration of this when the number of deaths in mass shootings since August 1, 1966 is compared with the number of firearm-related deaths in the last four years.

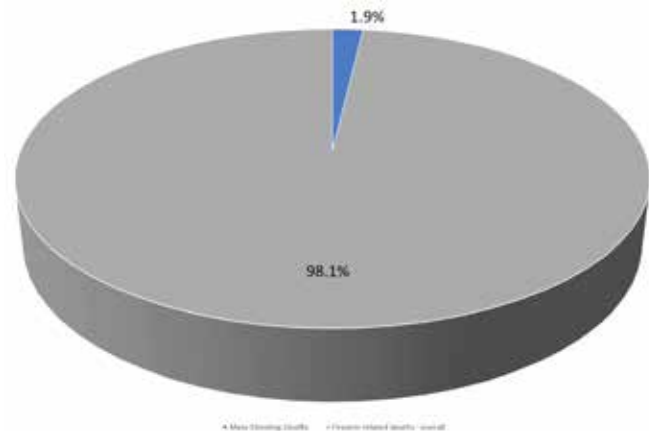


Figure 2: Mass shooting deaths in 51 years (1.9%) compared with firearm-related deaths, 2014-2018 (98.1%).

When we think about it, there is good reason for the attention mass shootings receive. To begin, they involve a large number of people. The shooting in Las Vegas involved the largest number of victims, 59 killed and 441 wounded. In addition, they tend to occur without warning and in rather non-descript areas. The theatre shooting in Aurora, CO is an example of both, and the Parkland, FL shooting is an example of the latter. More often than not the victims are victims not because of what they have done but, simply for where they happened to be at the time the shooting occurred.

Of course, the same could be said of the three children ages 2, 11 and 12 that were killed in the streets of Chicago in a span of 24 hours in 2017. Or, the 4-year old who was killed in 2015 while playing in the front yard of his aunt’s home, there because his mom could not fit him in the car while she took the rest of the kids to an amusement park. Or, the one-year old killed in 2016 while lying in her crib. Or, the 8-year old killed walking home after a birthday party, four days after Christmas in 2016.

The public is looking to the government for answers. Meanwhile, the politicians are busy pointing their fingers at one another claiming that answers are to be had were it not for the obstacles each other is throwing up. States are doing what they can to tighten gun legislation but, they don’t seem to have a major impact on the daily shootings that are taking place. Limiting magazine capacity may help reduce the potential of a mass shooting but it does little to deal with the other 98% of the deaths associated with firearms. It is getting to the point where victims are buying firearms to protect themselves because they can’t trust the police to protect them.

There is a solution, one that is not geared at gun control but shooter control. It is a strategy that, if implemented well, could have a significant impact on removing active shooters from the streets. The technology and infrastructure for the networking is already in place in many jurisdictions. Managed by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) it is the National Integrated Ballistic Information Network (NIBIN). However, it will require a shift in the mindset of those who have control over the technology and that is the thrust of this article on transformational forensics.

Transformational forensics is a commitment on the part of forensic science laboratories to collaborate with clients and stakeholders to identify needed change and creating a vision to guide that change. The goal is for our communities to become safer places for all to have an opportunity to reach their full potential. This is not strictly the forensic science of Edmond Locard, Alphonse Bertillon, Francis Galton, Calvin Goddard or most recently, Alec Jeffreys. It is a forensic science that recognizes that it has a public entrustment, an entrustment that requires it to look beyond the walls of the laboratory. Forensic laboratories not only have the expertise to evidence examination but, have the expertise and technology to contribute to an overall strategy to deal with gun violence.

Two primary areas will be highlighted in the rest of this article. The first is to briefly examine the current state of affairs with respect to forensic science and, more specifically, the discipline of firearm identification and history of ballistic imaging. The second is to provide a basic strategy that forensic laboratories can employ to not only make their ballistic imaging capabilities and services much more effective and efficient but, improve the efficiency of their firearm identification units as well.

Complicating a potential shift in focus and effort is that over the course of decades forensic science has boxed itself in pretty tightly. Even with technological advances that have allowed laboratories to do far more than ever, there have been calls for greater regulation and control. This call is due to poor practice, limited methodologies, mismanagement, and less than reputable scientists. As a result, forensic science laboratories exist within a system of boxes, almost looking like a series of nesting boxes as illustrated in Figure 3. The actual size of the boxes is dictated primarily by control, the control

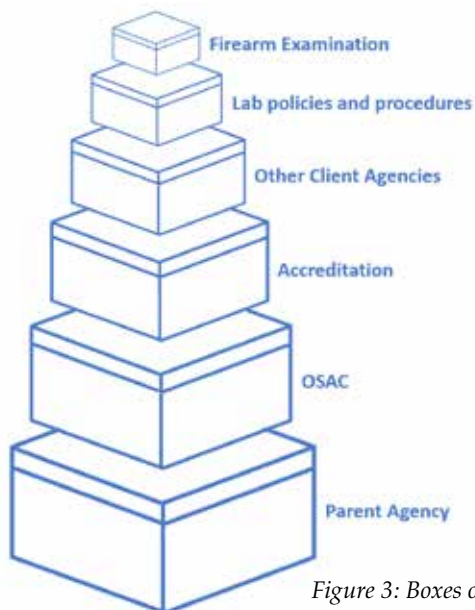


Figure 3: Boxes of regulation.

we seek to implement over our own box and the perceived control we allow others to have over what we do. An example of the latter is when the local prosecutor's office demands unnecessary testing be done to avoid issues in court that could be effectively argued away. Other things that dictate the size of the boxes include fear of retribution if a mistake is made and resistance to change.

When introduced to forensic laboratories, rather than attempting to determine how ballistic imaging might redefine the box of forensic firearm identification, it was simply fit into the existing box. When introduced, ballistic imaging technology was used on the back end of casework, providing a digital solution to an open case file that had been previously been a polaroid file, if kept at all. Only cases actually worked by the laboratory went in to the system and due to continuous backlogs, it was likely weeks after a shooting event if not months, if at all. Little was done to examine the potential of the technology and use it to expand beyond which had already been established and known. Much like some fish will not grow because of the confines of the aquarium into which they are placed, ballistic imaging didn't grow into its full potential because the box into which it was placed restricted its growth. The technology was quickly judged as being ineffective and a poor fit when, in fact, it was the **implementation strategy** that should have been evaluated and judged. To be fair though, a strategy to develop its potential was not developed because, in large part, the potential was not even recognized. Examiners were so focused on their box that they never considered the boxes of others.

Figure 4 is an example of the manner in which ballistic imaging was being handled early on and, in many places, is still the way it is being handled. Referring to the figure, imagine the following hypothetical scenario:



Figure 4: Early and typical ballistic imaging strategy

- Homicide 1 occurs and is submitted to the laboratory. After it is processed and compared, fired cartridge cases are captured using ballistic imaging technology.
- Two weeks later a drive-by shooting occurs in which there are no victims. The case is put to the bottom of the pile in this laboratory where examiners are busy working the latest homicide(s). That's if the case even gets to the laboratory because some laboratories are triaging these cases before they get in the door by restricting submissions in which there are no victims.
- Four weeks after the drive-by, there is another one in which a child is killed. There are witnesses to this one and after the case is processed and compared, it is entered into ballistic imaging technology and linked to homicide number one.

The laboratory celebrates closing two homicides, but what if that drive by shooting in the middle was committed by the same shooter(s) using the same weapon(s)? If that second shooting had been entered in a timely basis is it possible that the second homicide may not have occurred? Before dismissing this as a highly unlikely event, the reader should know that the scenario, though hypothetical, is based on events that did occur.

Changing the approach in the way firearm-related crime is handled in a jurisdiction can have a significant impact not only on the community served by the laboratory but also, the culture within the laboratory as well. The reason is that the approach moves from one in which laboratories are reacting to crimes that have already been committed to an approach in which the laboratory is a partner in responding to a crime problem. Rather than policing and investigations leading forensics, forensic can lead policing and investigations by providing them with timely, comprehensive ballistic intelligence. Rather than simply closing an open case and giving a family closure it is realistic to expect that shootings can be prevented thereby reducing the number of families that even need closure. Rather than being behind and always backlogged, the laboratories are dealing with the most current shootings and investigations thereby giving them a morale boost knowing that their work is immediately relevant. Finally, forensic science is no longer merely acting on behalf of law enforcement and the prosecution but, it is acting on behalf of the public.

Ballistic imaging can provide investigators with reliable firearm-related intelligence with respect to shooting incidents within hours of a shooting incident thereby increasing their effectiveness in investigating those shootings. Two keys from a forensic standpoint include comprehensive collection and timeliness. Simply put, every firearm-related incident has to be put into the database and it has to be timely, ideally within 24 to 72 hours while leads are still hot and the investigators have yet to receive a number of other cases. Every incident has to be considered because one never knows which incident will be the key link that will break open an investigation. Ballistic imaging is not just about linking firearms to cases, it is about linking events using firearm-related evidence.

The key to making a successful shift is in the strategy that an agency employs. Each jurisdiction, agency, and laboratory are different so a single detailed blueprint would not work. However, a successful strategy for a shift will generally consist of six primary elements, each of which will be addressed in turn.

The first of the six is foundational to the rest and that is understanding the difference between collaboration and cooperation. Computer software will often identify the two as synonyms but, as subtle as the differences are, they are quite significant. Those differences are visualized in Figure 5. Of

the differences, bullet point three needs further discussion. When there is simply an effort to cooperate, there is greater opportunity for resentment to build in one or more components of the team. Rather than focusing on doing what they need to do, the tendency is to focus on what other team members are not doing, waiting for an opportunity to say, "I told you so." When there is a spirit of collaboration, the focus is inward, seeking to ensure that the responsibilities to which they have committed are accomplished without regard for what others are doing or not doing. In order to be a true collaborator, it is essential that laboratories understand this is not about them, their needs and their staffing, or lack thereof. It is about the public and the needs of the public.

The second element is something that forensic laboratories should be quite familiar with, understanding the difference between desirable, important and essential. Ballistic imaging technology is a tool that turns a fired cartridge case into a potential eye witness that can point toward other shootings. It was not designed to be a perfect tool. Rather it was designed to facilitate in moments what may have otherwise have taken an examiner months, if it was attempted at all. It does not make sense to put perfection into an imperfect tool. If this concept can be embraced, there is very little that had been considered essential to actually be essential. Some examples might be helpful.

It had been considered essential that firearm examiners compare evidence prior to entry into NIBIN so that every gun represented at a scene is entered and to avoid replicate entries. However, so much of this effort would be wasted because not every case results in a lead, not every lead is a viable lead and not every case goes to court. Considering that essential keys to a successful ballistic imaging program include comprehensive collection and timeliness, a comprehensive examination of each and every case prior to entry is not feasible. A better solution is to have cartridge cases triaged by trained technicians for entry. If a lead is developed, evidence can be compared at a later time.

Another example of an essential is having firearm examiners perform correlation reviews to determine whether or not leads are present. However, this quickly becomes a low priority task and commonly set aside for more urgent tasks. As a result, correlation reviews get backlogged decreasing timeliness. A continuing problem that the NIBIN Programs deals with is the number of unviewed correlations system-wide. A better solution is to train technicians to perform correlation reviews with adequate quality assurance so that firearm examiners, if called at all, are only brought in to evaluate potential leads. At one particular location, a group of well-trained and supervised technicians have performed at a level in which 96+% of several hundred published leads that have been sent for confirmation came back as confirmed.

The third element is that the strategy has to include a regional approach. If an agency is to have success, it is important to have an ability to tie in with other jurisdictions and share data and intelligence. The reason is that shooters don't respect jurisdictional boundaries and the same weapon may be used in shooting incidents that are handled by different agencies. Without a way to share the ballistic imaging data

• Collaboration	• Cooperation
• Take ownership of our role in responding to a problem	• Do what we need to do to get through the problem
• We become a source of a team-based solution	• We become part of someone else's solution
• We understand our role is vital and take responsibility for ourselves without concern for what others are not doing	• We resent our role and look for failings in others to absolve ourselves of responsibility
• Respond to a crime problem hopefully reducing it in the future	• React to crimes that have already occurred with no vision for the future

Figure 5: Understanding the difference between collaboration and cooperation.

4. Reno, C., Kotas, Z. The Denver Crime Gun Intelligence Center (CGIC): An Example of Successful Implementation of NIBIN as an Investigative Tool. *AFTE Journal* 47(4): 238-243.

The laboratory celebrates closing two homicides, but what if that drive by shooting in the middle was committed by the same shooter(s) using the same weapon(s)? If that second shooting had been entered in a timely basis is it possible that the second homicide may not have occurred? Before dismissing this as a highly unlikely event, ...the scenario, though hypothetical, is based on events that did occur.

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this critical intelligence is lost. Currently, the only way to do this in the United States is by being a part of NIBIN.

An example of the negative impact isolation can have occurred when one regional laboratory made the choice to remove itself from NIBIN. The laboratory made this decision, in part, based on statistics that showed only 3% of links were outside that region. However, they were not close to being comprehensive in data collection. In addition, this low statistic did not make intuitive sense considering some of the cities outside the region but still close in terms of distance. As it turned out, I helped to organize the NIBIN component of a short-term initiative in one city inside the laboratory's region of responsibility. In a span of four months, over 50% of the leads were from outside the county served by the regional laboratory. The laboratory has since re-joined NIBIN and has been seeing much more success.

The fourth element focuses on division of labor. Firearm examiners have been integral to many NIBIN programs in laboratories. However, ballistic imaging technology is a screening tool that does not require the same level of expertise as a comprehensive examination. Therefore, not everything needed for a successful crime gun strategy utilizing ballistic imaging technology requires a firearm examiner. In fact, several agencies have developed very successful NIBIN programs in which firearm examiners are not involved at any level apart from a later confirmatory examination of evidence. Will it be perfect? No, but it will be much more efficient and effective and free examiners to do only what examiners can do.

The fifth element is flexibility. To begin, every collaborator has to evaluate their needs and define what is truly essential. This is critical because everyone involved in the program has become accustomed to a comfort zone. Each must be willing to consider other ideas and needs outside that comfort zone. Without this, any collaborative effort will eventually fail as one or more partners are seen as looking out for their best interests only. Flexibility is also important because not everything will work as well as initially planned or thought. It is important to be prepared to make changes until processes get synchronized well. Finally, new issues may develop that had not been anticipated so adjustments may be necessary.

These adjustments lead into the sixth and final element, start small and build wisely. There are several key principles associated with this element. The first is that if the laboratory is a regional, then a key city within that region should be selected to begin. This allows for the processes and procedures to be ironed out before embracing other cities within the region. If accredited, the project can be defined as a short-term pilot program to help explain variances, keeping a good record of what was done and why. It should be noted that those

elements considered important to a successful crime gun intelligence strategy have been incorporated into accredited laboratories with no issue.

Another key principle addresses the backlog. It seems counter-intuitive but, it is critical that the backlog not be prioritized. It is already too late for those cases and puts current cases at risk. Therefore, it is important to stay current as the first priority and work into the backlog only as time is available. If this is done, it is important to work in reverse order, the most recent backlogged cases first. It is true that there may be an opportunity to close an open case but, this should not be the priority over potentially preventing the next shooting.

Clear and on-going communication is also important. Those involved as collaborators should have regular, on-going meetings to assess processes and procedures, being transparent about what is working and what is not working. No one likes meetings but successful programs have found that regular meetings are essential in keeping everyone on the same page. They also help to provide accountability to ensure everyone is doing their part.

The final principle may be the hardest to swallow. It is easier to justify funds based on a pilot of success than it is to justify funds based on program potential that a laboratory has not yet achieved. Initially, sacrifices should be expected, re-allocating existing resources to demonstrate that success can be achieved with limited resources on a small scale. This success can help to pave the way for funding to increase the scope and capabilities of the program.

There have been several successes when applying these principles, one of which was published in the *AFTE Journal*.<sup>4</sup> Started in January 2013, the following statistics were reported through March 2015 by the Denver Police Department and their crime gun intelligence program involving NIBIN. In this period, there were 310 confirmed links between shootings. Through those links, 75 different shooters were identified and/or arrested. Of those shooters, 34 faced state charges, 13 faced federal charges, and five parole revocations were made. In addition, 23 officer safety bulletins were issued, warning police of potential shooters of which they should be aware.

Over the last century, forensic science has undergone a significant evolution. In the beginning, there was a more intimate connection with law enforcement and investigations. Over the last decades, there has been increasing separation, with some suggesting that forensic laboratories need to be completely separate from investigations and law enforcement. With the advances in technology, forensic laboratories are being called upon to do more and more and, as such, are relegated to a position of reacting to crimes because there seems to be little time for anything else.

However, it is important to understand that forensic science can play a pivotal role in dealing with a crime gun problem and need not be restricted to reacting to shooting incidents as they occur. In order to do so, forensic science laboratories and firearm examiners must be willing to expand their boxes, both personally and organizationally. Success is possible and will require a collaborative effort to achieve. The good news is that agencies have demonstrated that changing the manner in which they have dealt with crime gun investigations has led to success in reducing the firearm-related violence. It may not be possible to stop every mass shooting but, with this innovative approach, it will be possible for communities to get their future back.



# CAC Board of Directors Candidates for office



## **Alice Hilker** **For President Elect**

It is truly an honor to be nominated for the position of President-Elect. If elected, I will strive to serve the membership to the best of my ability and to continue to support the ongoing dialogue within our organization as well as with other forensic organizations. I have been a

member of the CAC since moving back to California from the east coast in 2001. I served as the Northern DNA Study Group chair for seven years (2005-2012) and on the Board of Directors as the Regional Director North from 2013-2016. As Regional Director, DNA Study Group chair, as well as Seminar Chair for the Fall 2015 CAC Seminar, I have participated in and organized many CAC events. I have seen the direct benefits that collaboration and professional involvement have in our careers as criminalists and the many ways that the CAC promotes learning and scientific discourse. Because of this, I hope to be able to return to the CAC Board of Directors as President-Elect. Thank you for your consideration.



## **Megan Caulder** **For Membership Secretary**

It is an honor to be nominated for the CAC board position of Membership Secretary. I am currently employed by the California Department of Justice Jan Bashinski DNA Laboratory. I started there as a criminalist in 2009 working in the Databank section and have since been promoted to senior criminalist and am working in

the Biology/DNA Casework section. I am also certified in Molecular Biology by the American Board of Criminalistics.

I first joined the CAC in 2005 as a Student Affiliate member while working on my master's degree in Forensic Science at UC Davis and later gave a presentation on my thesis research at a DNA workshop. I eventually became a Full member in 2011. I served as the Northern DNA Study Group Chair from 2013 to 2016 and have attended many CAC workshops, seminars, and study group meetings over the years. I value my involvement in the CAC as it offers a way to communicate and collaborate amongst colleagues about current forensic technologies, issues, and cases.

I have had the pleasure of serving the CAC as Membership Secretary since 2016 and would be thrilled to contribute to the Board of Directors in this role for another term. Thank you for your consideration for the position of Membership Secretary.



## **Gunther Scharnhorst** **For Recording Secretary**

I am a senior criminalist working for the California Department of Justice at the Jan Bashinski DNA Laboratory in Richmond where I am a member of the Method Development unit. My coworkers and I test and validate new protocols and technologies in DNA analysis for

the Bureau of Forensic Services. Protocols I have contributed to are used by BFS casework units around the state, the Data Bank, and California's familial search program. I also hold a certification in Molecular Biology by the American Board of Criminalistics.

I have been serving as your Recording Secretary since 2016 and am honored to be nominated for another term. I have learned a lot about the CAC during my first term. Along the way, I was given the opportunity to help open a previously inaccessible door into the CAC's history for the membership: I recently completed the scanning and archiving of CAC business and board meeting minutes dating from the mid-1960s until 1998 when they began appearing on the website. These pieces of the CAC's history were almost forgotten, but will soon be easily available to the entire membership.

It was an honor when I was first considered for this office and I would greatly appreciate your support for another term as your Recording Secretary. Thank you.



## **Cindy Fung Anzalone** **For Regional Director North**

After earning my degree in biochemistry and cell biology from the University of California in San Diego, the San Mateo County Sheriff's Office hired me as a criminalist assigned to the Controlled Substances and Toxicology sections as

well as the Crime Scene Investigation team. Two years later I was cross-trained in the Forensic Biology/DNA unit where I remained since. I have been a CAC member since 1999 and previously served as assistant treasurer from 2002 - 2008.

I am excited to run for a second term as the CAC Regional Director - North. I have attended numerous CAC seminars and study groups and have always enjoyed the professionalism, comradery, and sense of purpose as to why our organization exists. Serving the CAC the past two years has been extremely rewarding and I have enjoyed meeting the members of our organization. I would be honored to serve the membership for another two years as the Regional Director - North.

# Inside the Criminalist

## A questionnaire

I hope you all enjoy this first of a series called "Inside the Criminalist." This format may seem familiar if you're a fan of 'Inside the Actor's Studio' with James Lipton. These personality-based questions known as "confession albums" began appearing around the end of the 19th century. They became a posh parlor game played by the Victorian wealthy literate. The most famous of these questionnaires was one filled out by the French novelist Marcel Proust, and therefore the game became commonly called the Proust Questionnaire. My goal is to open members up and give them a glimpse of who their fellow members are. People from different cohorts, whether you're a new member, serve on the CAC board or a prestigious forensic T-Rex, can seem intimidating to approach. My hope is to help build bridges between members by providing more insight into the person behind the criminalist. Perhaps it will encourage someone to take that extra step and approach them at a seminar or study group and strike up a conversation.

—Meiling Robinson

### What is your name?

Mey Tann

### When did you first join CAC?

1995

### What is your most marked characteristic?

My sister would say I am tough on people. But I would put it differently. I would say, I have high expectations of them. Having high expectations can easily lead to disappointment. But I think if you don't hold people to higher standards, you may not get the best from them.

### What do you appreciate the most about your friends?

They are there for me when I "really" need them. I know I can always count on them.

### What is your main fault?

I struggle with saying "no" to people. At times, I say yes, even if it's to my detriment.

### If not yourself, who would you like to be?

An individual who has the power, platform or ability to effect change.

### Who are your favorite authors/ poets?

Lucy Maud Montgomery (Anne of Green Gables)/Lord Alfred Tennyson

### Who are your favorite heroes/ heroines in fiction?

Wonder Woman

### What is your idea of perfect happiness?

Sitting on the veranda with a cup of hot tea or coffee overlooking the rolling green hills (or any beautiful view for that matter) with loved ones.

### What is your greatest fear?

When I was on the homicide on-call list, my greatest fear was having to work/ process a decapitation scene/case.

### Which living person do you most admire?

Those individuals that will speak up for those who are unable to do it for themselves.

### Which living person do you most despise?

Despise is a harsh word. What I would say is that I do not like those who are false, fake or pretend to be someone who they are not.

### What or who is the greatest love of your life?

I love sports. I'm a huge fan of the Duke Blue Devils Men's Basketball Team.

### Which talent would you most like to have?

I wish I had more musical talent. I used to play the flute when I was in grade school. I was good, but I had to give it up and focus on my studies. I would've liked to learn to play more musical instruments. I've always wanted to learn how to play the piano or the guitar.

### If you could change one thing about yourself, what would it be?

I'm too emotional. I cry at the drop of a hat.

### What do you consider your greatest achievement?

My greatest achievement is my current job as a criminalist. I am very thankful and appreciative of my life here in the states. My job as a criminalist has given me many opportunities. It has afforded me the ability to travel and see the world and it has allowed me to meet amazing individuals in forensic science doing great work. I was not born in the states. My family and I came here as immigrants back in 1981 and we didn't have much back then. We didn't know the language. My dad worked in housekeeping at the Radisson Hotel and my mom sewed in the basement of a fur coat store. We've come a long way from those blizzard days in Minnesota. My parents worked hard and put me through college giving me the opportunity to succeed in life. And they did just that, because here I am, working, living comfortably, and contributing to this great nation we call the United States of America.

### If you were to die and come back as a person or a thing, what would it be?

Travel journalist.

### What is your favorite occupation?

Those medical personnel working in war torn and/or third world countries.

### Which historical figure do you most identify with?

It's difficult to identify with just one historical figure. I would have to say....any immigrant who came here to the states with nothing but through hard work and commitment has become a productive member of society.

### What is your greatest regret?

I would've liked to study abroad when I was younger. I've tried to make up for lost times by traveling as much as I can now.

### What is your motto?

Be happy. Hope that you fall in love. And try not to hurt anybody. (Alex P. Keaton)

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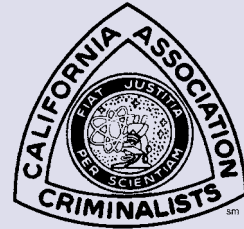


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