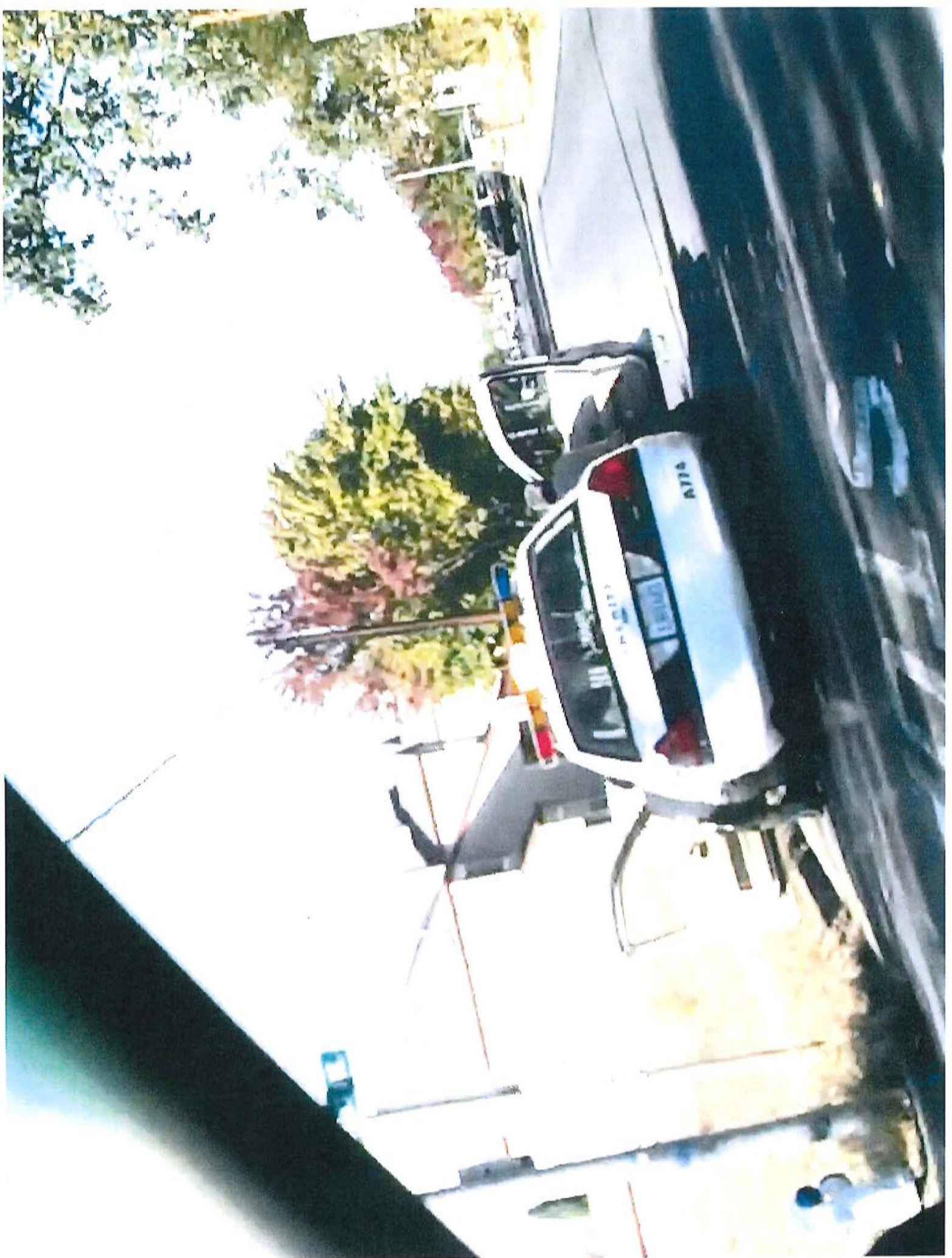


# **APPENDIX A**





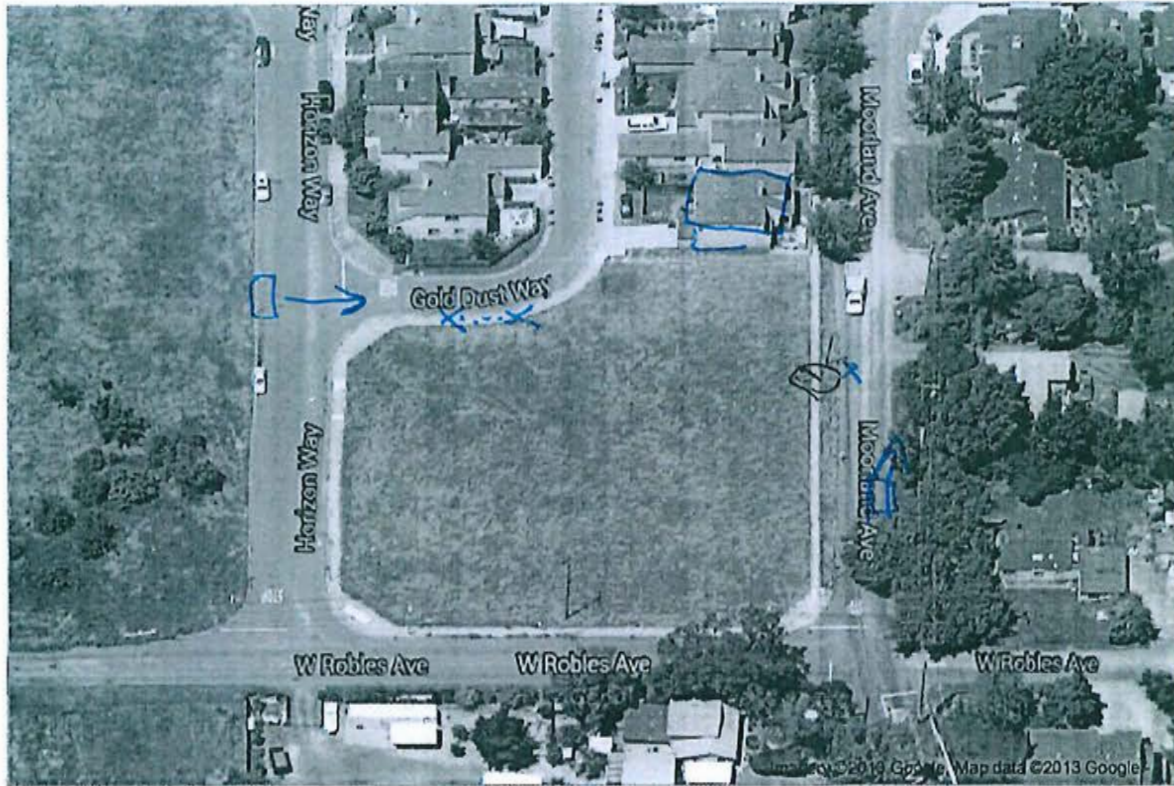
**John Doe #4**



# **APPENDIX B**

Google

To see all the details that are visible on the screen, use the "Print" link next to the map.



Rosa, California 95407 did not match any locations.

It? Add it to Google Maps!

# **APPENDIX C**



## CURRICULUM VITAE

### CRAIG T. FRIES

Precision Simulations, Inc.

Phone: (530) 477-5820

Fax: (530) 477-5819

[craig@precisionsim.com](mailto:craig@precisionsim.com)

TIN: 91-1842702

### SUMMARY:

Craig Fries founded Precision Simulations, Inc. (PSI) after working as director of computer simulations for Visual Forensics, a senior analyst for Visual Science Research Corporation and a lead research assistant for NASA sponsored studies. As a leading proponent of the use of computer generated simulations and forensics animations, Craig developed the first forensic animations developed using laser scanning data admitted into a court trial in the US, the first 3D animation accepted in Santa Clara Superior Court and the first forensic animation admitted into a court trial in Hawaii. Craig has written articles on accident and crime reconstruction and animation for Forensic Magazine, Claims Magazine, the California District Attorneys Association Quarterly Journal and Right of other publications. Craig has taught extensively in the areas of 3D animation, Laser scanning, Photogrammetry, Video Analysis, 3D Ballistic Trajectory Analysis and admissibility of animation.

Craig has maintained a 100% admissibility record for courtroom submissions of his animations and analyses.

### PROFESSIONAL HISTORY:

#### *1997 - Present*

PRECISION SIMULATIONS, INC., - Founder and CEO. Combining scientific analysis with 3D computer technology, Craig created a unique process to produce 3D computer generated reconstructions and animations. These animations are very precise and accurate, earning PSI a record of 100% admissibility to the courtroom over a fifteen (15) year period. Craig has pioneered the adaptation of Laser Scanning to add accuracy and realism to computer generated reconstruction of crimes and accidents. PSI created the first laser generated 3D reconstruction and animation to be admitted into court in the US. These tools are now being routinely used to recreate computer accident and crime scenes where evidence has been lost or compromised and where access to the scene is severely restricted or totally prevented. Craig previously pioneered the use of computer generated 3D graphics in condemnation litigation and the use of 3D visualization and animation to create virtual environments, to show drive thru's and fly-over's of planned projects.

**1992 – 1997**

VISUAL FORENSICS- Director of Computer Animation. Developed forensic visualization programs and created complex aviation animations for cases involving US government. Directed and created first computer animation accepted in Santa Clara superior court. Contributed to first human vision simulation based on empirical data to be accepted into trial in US. Developed image processing techniques to display visual function for litigation.

**1992 - 1997**

VISION SCIENCES RESEARCH CORPORATION- Senior Analyst. Active in research and development of advanced functional vision test methods and products. He designed and built a unique Night Driving Simulation System (NDSS), approved for use in FDA protocols and clinical trials. He pioneered the use of the NDSS in vision related litigation. Designed and created EyeView™, a patented software system to measure and demonstrate human functional vision levels. Worked extensively on mathematical analyses for injury accident cases.


**1991 - 1992**

CALIFORNIA STATE UNIVERSITY, HAYWARD - Lead Research Assistant, working on NASA funded basic research into sense and perception of astronauts. Performed statistical analysis for study data and presented extensively at NASA meetings at the Ames Research Center.

## **EDUCATION:**

B.A. Psychology, California State University, Hayward, 1991.

## **AFFILIATIONS:**

Member California Attorneys for Criminal Justice  
Member International Right of Way Association   
Member Transportation Research Board – Task Force on Visualization  
Member Forensic Expert Witness Association  
Member Association of Crime Scene Reconstructionist

## **PATENTS:**

Co-Inventors, Dr. Arthur P. Ginsburg, Lawrence H. Tessler and Jonathan Tiff, "Objective Patient Vision Comparison Process and Apparatus", No. 5,552,842.

## **PUBLICATIONS:**

Right of Way Magazine – "Virtual Valuation-Simulating an "After" Condition" Nov/Dec 2005  
Claims Magazine – "New Tools for Reconstruction" - February 2006  
Forensic Magazine – "Reconstruction with 3D Laser Scanning" - August/September 2006  
Prosecutor's Brief – The California District Atty. Association Quarterly Journal – Sept. 2006  
Plaintiff Magazine – "Caught in the act!" – August 2007  
Advocate Magazine – "Caught in the act: Accident reconstruction from video footage"- Sept. 2007



# **APPENDIX D**



# FORCE SCIENCE® INSTITUTE Ltd

www.forcescience.org

May 2, 2014

Mr. Tim Dempsey  
600 Administration Drive, Room 212  
Santa Rosa, CA 95403

RE: Mr. Andy Lopez - OIS Sonoma County

Dear Mr. Dempsey:

Thank you for the kind invitation to work on this case. I have reviewed and considered the following material:

Items received on March 5, 2014:

1. Primary Report/Incident Summary
2. Case Summary
3. Event chronology/CAD Log - SCSO
4. Event chronology/CAD Log - Santa Rosa PD
5. Interview of SCSO Deputy Erick Gelhaus
6. Interview of SCSO Deputy Michael Schemmel
7. Interview of SCSO Deputy Bryan Jensen
8. Interview of SCSO Deputy Jack Neely
9. Interview of SCSO Deputy Salvatore Barusso
10. Interview of SCSO Deputy Terry White
11. Interview of SCSO Deputy Mike Raasch
12. Interview of SCSO Deputy Brad Burke
13. Interview of CHP Sgt. John Evans
14. Interview of CHP Officer Patrick Burnett
15. Interview of SRPD Officer Mike Clark
16. Interview of SRPD Officer Julio Del Angel
17. Interview of Rodrigo Lopez
18. Interview of Sujey Lopez
19. Interview of [REDACTED]
20. Interview of [REDACTED] John Doe #3
21. Interview of [REDACTED] John Doe #4
22. Interview of [REDACTED] John Doe #9
23. Interview of [REDACTED] John Doe #1

*Conducting the leading research into human performance in high-stress law enforcement encounters.*

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T: (507) 387-1290 F: (507) 387-1291  
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Chicago  
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Chicago, IL 60630  
T: (773) 481-4964 F: (773) 913-6205  
info@forcescience.org

24. Interview of [REDACTED]
25. Interview of [REDACTED]
26. Interview of [REDACTED] John Doe #2
27. Interview of [REDACTED] John Doe #7
28. Interview of [REDACTED] JANE Doe #1
29. Interview of [REDACTED] JANE Doe #2
30. Interview of [REDACTED]
31. Interview of [REDACTED] JANE Doe #3
32. Interview of [REDACTED] John Doe #16
33. Interview of [REDACTED] John Doe #8
34. Interview of [REDACTED]
35. Interview of [REDACTED] John Doe #12
36. Interview of [REDACTED] John Doe #13
37. Interview of [REDACTED] John Doe #5
38. Interview of [REDACTED] JANE Doe #6
39. Interview of [REDACTED]
40. Interview of [REDACTED] JANE Doe #5
41. Interview of [REDACTED] JANE Doe #4
42. Interview of [REDACTED] JOHN Doe #14
43. Interview of [REDACTED]
44. Interview of [REDACTED]
45. Interview of [REDACTED] John Doe #11
46. Spanish translation of parents interview
47. Death notification to parents
48. List of Area residents contacted
49. Supervised Area Canvass
50. Interview of [REDACTED]
51. Interview of [REDACTED]
52. Interview of [REDACTED]
53. Interview of [REDACTED]
54. Emergency Medical Personnel Interviews - Joseph Dwyer, Lucas Bohanan, Nancy Bradley, Neil Nicholson, Nathan Dejung, Steven Humes, and Thomas Cozine
55. DOJ Work request/Ballistics report
56. Major Incident Log
57. [REDACTED] cell download John Doe #11
58. Crime Scene Description/evidence
59. Photography/Scene Processing 10-23-13
60. Aerial photography/scene processing
61. Total Station & pictures
62. Processing Deputy equipment/clothing
63. Processing Deputy patrol vehicles
64. Supervised crime scene
65. Press releases
66. Summary report of autopsy
67. Autopsy Evidence Collection



66. SCSO/Medical Examiner report
67. Autopsy/Patient care report AMR
68. Response report/Lopez attorney
69. Response report
70. Inspected replica AK47 investigative report
71. Purchases replica & warning disclaimer
72. Replica VS real AK47 press conf. & pictures
73. SCSO Chronology & dispatch audio
74. Toxicology report
75. Transporting evidence from lab to SRPD report
76. SRPD dispatch audio
77. KGO News story re: witness
78. Contact & secure [REDACTED] Moorland Ave report
79. Cook & Lewis School contact report
80. Investigative report of attempt contact with area witness
81. Removal of replica from evidence report
82. Scene Security reports
83. Petaluma PD OIS reports
84. SCSO OIS reports
85. Andy Lopez I-Lead Reports
86. Evidence sheets - alphabetical order
87. Name list of all contacts

## INTRODUCTION:

I have a B.A. in Psychology and Sociology (1967) from Lakehead University in Thunder Bay Ontario. I then took approximately three years of graduate course work in psychology from Minnesota State University Mankato, the University of Ottawa, the University of Vermont, and the Alfred Adler Institute in Chicago. I have a M.A. in Counseling, from the University of Arizona (1979). I have a Ph.D. in Psychology with a core concentration in Police Psychology (1988) from Union Institute. All of my Ph.D. classes were residential and I was not required to, but did have, a clinical internship with the Behavioral Science Unit with Tucson Police Department. I have two undergraduate courses in research, three courses at the master's level and one at the doctorate level. I have had graduate course work in physiological psychology and perception including conducting a major research project on perception. The focus of my doctoral work was on training techniques for critical incident decision-making.

I was a professor in the Law Enforcement Program at Minnesota State University, Mankato, Minnesota, U.S.A. for 28 years. I was also Director of the Law Enforcement Program, which upon graduation made our students eligible to take the state police officer license exam. In essence, I directed a university based police academy. I was also Chairperson of the Political Science/Law Enforcement Department. While so employed I developed the Force Science Research Center within the College of Social and Behavioral Sciences. The mission of the research center was to research human performance in high stress encounters such as police use-of-force - something I have been personally researching since 1975. Although I am now retired

from my position as professor, I continue to direct the Force Science Institute, Ltd. and maintain a relationship with the University through a position as member of the Visiting and Collaborative Graduate Faculty. Minnesota State University has also named a lecture series after me entitled "The Lewinski Lecture".

As documented in the attached CV and related materials my professional background and experience is in the area of helping officers through training to achieve optimal performance in high-stress encounters. This involves the study and understanding of human dynamics involved in lethal force encounters. In both areas of endeavor, I have extensively studied human perception, attention, decisions, reaction time, memory, etc. These topics have been extensively studied and documented in the field of psychology, some of them for over a century and a half. Force Science has conducted a number of studies to assess how mainstream knowledge in these areas applies to the particular dynamics of law enforcement scenarios. By way of illustration, human perception and contextual influence have been extensively researched for over a century and reaction time has been researched for a century and a half. Force Science has endeavored to build upon the existing base of knowledge by carefully controlled examinations of how officers of varying levels of experience perceive information and react in profession-specific contexts such as a simulated deadly force encounters. The current focus of our research is on subject and officer movement in lethal force encounters as well as action/reaction parameters (including judgment and movement patterns and time) perception and memory.

An article co-authored with Dr. Audrey Honig, entitled *A Survey of the Research on Human Factors Related to Lethal Force Encounters* was published in the Law Enforcement Executive Forum in August 2008. In the same journal, I have also published an article on our research on *The Influence of Officer Positioning on Movement During A Threatening Traffic Stop Scenario* and *A Study on the Presence of Selective Attention in Firearms Officers* and another publication on *New Developments in Understanding the Stop Shooting Response*. This last publication involves among other things, a comparison between the 'stop shooting response' and the movement of a person, using our Speed Grid to ascertain the speed of a subject in miles per hour from the length, time and cadence of a subject's step. Further, in conjunction with a number of other authors, I have published in peer reviewed journals an article *Performing Under Pressure: Gaze Control, Decision Making and Shooting Performance in Elite and Rookie Officers* on the effect of visual focus on shooting decision and accuracy in the Human Movement Science Journal, an article on *Fired Cartridge Case Ejection Patterns*, which focused on the effect of the manipulation of handgun on ejection patterns, published in the Investigative Sciences Journal and *Witnesses in Action: The Effect of Physical Exertion on Recall And Recognition*, in Psychological Science Journal. I have also published in The International Journal of Exercise Science an article entitled *The Influence of Start Position, Initial Step Type and Usage of a Focal Point on Sprinting Performance*. This article focused on the movement time of an officer confronted with an edged weapon attack or an oncoming vehicle. We have just had a journal article accepted for publication in Police Practice and Research: An International Journal. This article is on the memory of an officer for automatic behavior in a high stress, deadly force encounter. All publications and news lines that contain our research are available on the Force Science website at "<http://www.forcescience.org>". We have also presented our research at a number of blind, peer-reviewed conferences including

two presentations to the American Psychological Association, Law Society Conference, and we were approved for presentation to the American Society for Engineering Educators, International Colloquium in Beijing, China. The peer-reviewed process for China was used on our Tempe Studies and the equipment we developed and used for that study. We have been invited twice to present to the International Association of Chiefs of Police (normally at least a screened process) once to the main body on the application of our research to their policy recommendations, and the other time by the Psychological Services Section of the IACP. Since then I was invited in 2012 to present our research on officer safety on traffic stops to the Patrol and Tactical Operations subcommittee and in 2013 I was an invited panel presenter in a *Plenary Session on Officer Involved Shooting – Investigative Protocols: A Presidential Initiative*. I have also done two presentations on our research to a Criminal Justice Committee and a Human Rights Committee from the Houses of Parliament, both the House of Commons and the House of Lords, in London, England.

Related articles on commands, memory and decisions in critical incidents have been published by us in the peer reviewed Law Enforcement Executive Forum and the Police Quarterly, and in the non-peer reviewed but screened FBI bulletin. (Please see the attached C.V.)

I have qualified as an expert on action/reaction, perception and memory in force or lethal force encounters in criminal courts in Arizona, California, Connecticut, Florida, Iowa, Maryland, Massachusetts, Missouri, Minnesota, Ohio, South Carolina, Texas and Alberta and Manitoba, Canada. I have also qualified as an expert in federal or state court in Arizona, California, Connecticut, Illinois, Iowa, Kansas, Florida, Oregon, Maryland, Minnesota, Ohio, Oklahoma, Texas and Washington on the same topic.

I have made multiple presentations to a variety of associations for crime scene analysis and reconstruction. Our research results on the behavioral science elements of officer-involved shootings (dynamics, perception, action/reaction, decision making, memory) are being used internationally in crime scene reconstruction. We have provided week long Certification Courses on the behavioral science aspects of officer-involved shootings and use of force to investigators throughout the world and contracted for exclusive courses with New Scotland Yard, the Royal Canadian Mounted Police and Homeland Security. Officers and representatives from the following U.S. and Canadian Federal Agencies have attended our course: ICE, FBI, DEA, ATF, Department of Interior, Department of Defense (Canada), Canada Border Services Agency, US Department of Veterans Affairs, TSA, Diplomatic Security Service, FLETC, Federal Protective Service, Federal Reserve Police, Great Lakes Naval, US Army, US Navy, Ministry of Community Safety and Correctional Services (Canada), National Park Service, Pentagon Force Protection Agency, Royal Canadian Mounted Police, US Courts National Training Academy, US Customs and Border Protection, Department of State, US Department of Agriculture, US Marshall Service, US Probation Service, US Attorney's Office. It has also been provided to a variety of other federal, state and local law enforcement officers from these and 6 other countries.

Publications on our research and video illustrations are posted on the Force Science website or the research can be reviewed in the Force Science News.



## PREAMBLE:

There are centuries of scientific study on human behavior that can be brought to bear on our understanding of the human elements at issue during an officer involved fatal encounter. Applicable subtopics of study include, (but are not limited to)

- Perception – the means by which humans perceive and then covert the raw data into meaningful information
- Action/reaction time – the time it takes to initiate a movement that is perceived as a stimulus, and the time a responder takes from the presentation of a stimulus to the initiation of a response.
- Motor movement time – the time it takes to complete or deliver the reaction.
- Processing or Decision Method and Decision Time – the method by which we drive forward a decision, which can vary according to the immediacy and severity of a perceived threat. Research further delineates that an individual's training and experience in functioning under similar threat conditions, impacts on the methodology and time for decision-making.
- Memory – which is a function of attention and is affected by a variety of factors including during and complexity of the incident, emotional distress, rest, review, the level of threat perceived by the actor, etc.

We can use this information to accurately and objectively inform our understanding of at least some of the elements of an incident under examination. An analogous methodology has been used in the field of accident reconstruction for decades. For instance if an officer is simply driving a car, receives a cell phone call and glances down to see who is calling on their cell phone and then looks back to the road, we know from a large number of studies how long that action would generally take. If we then also knew the speed at which the officer was driving we could determine the distance travelled during the period of inattention. Likewise in armed encounters, we generally know how long it takes a trained officer to perceive a threat and react to that threat by firing a gun. If we have reliable information to use about the movement of the officer's opponent in the encounter, we are able to draw reliable conclusions as to the location and actions of the opponent at the time the officer decided to respond with deadly force.

Similarly there are almost two centuries of research on human behavior that have application to officer-involved use of force encounters. Trainers, investigators, administrators and jurists throughout most of the western world are applying at least some element of this research. Most of the research is generally done on average human beings. Some has been done by the military. Some has been done with law enforcement. Force Science Institute, Ltd. and the Force Science Research Center have done considerable research on our own that stands on this extensive preexisting body of knowledge and helps us apply many principles that derive from these centuries of research. This research can then be applied to a rapidly evolving, high stress encounter such as a police shooting. Knowledge of this research is not "mind reading" or psychoanalyzing an officer. It simply explains the behavioral foundation of an officer's performance in a high stress encounter and has the potential to help anyone trying to

understand or judge an officer's behavior, "frame of mind" during a shooting incident, as well as the dynamics of the physical interaction between the subject and the officer.

## REPORT:

### PURPOSE:

I was asked to utilize my particular fields of expertise to analyze the circumstances which form the basis of this case and to provide information, opinions, and conclusions that are reliably supported, to a high degree of scientific certainty, by established and acceptable standards. Subsequently when I review a case such as this I consider the following elements and the research that assists in clarifying an officer's behavior.

### RELEVANT INFORMATION:

- Deputy Gelhaus Interview (p. 5) Oct. 22, 2013. "When my door was open, as I was getting my pistol forward between the V of the door, I challenged the man. I yelled drop the rifle, the muzzle of the rifle coming up in my direction as he turned and I began to shoot, because I thought he was gonna shoot me. Um, I continued to shoot until he went down."
- Deputy Gelhaus recognized the apparent long barreled, assault type rifle as an AK47 that fired rounds that would not be stopped by his vest and could to some degree also penetrate a vehicle. Subsequently his protection, which was his vest and vehicle, could not provide protection or cover for him. The ammunition fired from this type of weapon, has, been designed, within the last few decades, to defeat bullet proof vests and can also penetrate the side of an automobile.
- Individuals who are not familiar with weapons or weapon management may inadvertently swing or point guns at people without being aware of the implications of their movement and the response of others.
- It is unfortunate that the single largest threat facing police officers today and the highest demand for police training is responding to the threat of an active shooter. Attorney General Eric Holder just asked Congress for 15 million dollars for 'active shooter' training. Law Enforcement may be more aware today than other time in history of the threat from the lone, young man with a gun or a knife.
- Many replica handguns or long barreled weapons have the appearance of actual firearms. The replica is often designed and molded to appear as real as possible and therefore inversely, a real weapon has the appearance of a replica. Manufacturers make an effort to make the replica distinguishable from a real weapon. Unfortunately, as apparently occurred in this incident, the distinguishable feature can accidentally or intentionally be



altered or removed so the replica cannot be distinguished from a real weapon without close inspection. When an officer perceives a weapon is being pointed at them the very nature of the action/reaction paradigm prohibits the officer from having the time to closely inspect and distinguish the modified replica from a real weapon.

## DECISION, ACTION AND TIME:

1. Since the time of Aristotle, Western culture has accepted that reasoning is virtuous. The tenor of his teachings, which were further reified by Augustine and Descartes was that morally acceptable decisions were only possible when we renounced passions and emotions to the quest for rationality in all endeavors. The modern day result is our disposition to view decisions arrived at through the application of reason as good, and to view all others as presumptively suspect. The law enforcement and military community, like much of Western society, has long embraced the notion that our behaviors are the result of conscious thinking. So we have endeavored to teach officers how to consciously apply rules as a basis for making decisions and to implement these rules with the conscious awareness of the use of the appropriate instrument (e.g. pistol or rifle).
2. Research over the past decades yields new insights into how successful performers in a variety of occupations make decisions in urgent situations. The research reveals that conscious deliberation does not account for all decisions; it may account for only a small portion (Janis & Mann, 1977; Kibele, 2006; Poplu, Baratgin, Mavromatis, & Ripoll, 2003; de Vries, Witteman, Holland, & Dijksterhuis, 2010). To perform at an expert level, both the athlete and the military or law enforcement officer, particularly in combat or ambush situations must have well developed abilities to: (1) Rapidly identify patterns that have meaning; (2) Use that information to anticipate what will happen; and (3) Use their experience and training to rapidly identify and, with little conscious effort, drive forward workable solutions to the problems that conform to their trained values and ethics. Well-trained officers perform just as well-trained athletes perform. Vickers (2007) said the good athlete knows what is going to evolve, where it is going to evolve, how it is going to evolve and when. This is especially true in rapidly evolving situations where neither the athlete nor the officer has either the time or the opportunity to let a situation fully unfold before they need to react.
3. Based on training and experience, all humans make predictions about the outcomes of circumstances unfolding before them. A multitude of examples can be found in the common experience of driving an automobile. For instance, when coming upon an intersection and seeing a car rapidly approaching a stop sign on a cross-street, a driver must quickly evaluate whether the approaching driver will stop (and therefore they need not take evasive action) or the approaching driver will drive through the stop sign (in which case they will likely “react” and initiate an action to protect their safety). Humans engage in prediction as an adaptive response to the reality that waiting for complete and confirmatory information may leave us without time to react and safeguard ourselves. Turning to examples from athletics brings the action/reaction paradigm into clearer focus. Successful baseball batters predict the ball’s path of travel as it leaves the pitcher’s





hand. If they were to wait to confirm the path of the ball as it went by them they would, of course, be too far behind the action to have their “reaction” of swinging the bat be effective.

4. Humans rely to a large extent on pattern recognition as a basis for perception and also to deriving meaning about an event. (Kibele, 2006) Patterns may be static (as in a photograph) or stretched over time (as in a movie). Contemporary training in law enforcement, as well as experience in handling firearms, generally provides officers with a considerable store of information to use for the purpose of detecting threatening movements and patterns of behavior. In the absence of a consequential threat and time compression, officers may seek confirmatory information and engage in a comparison of options before initiating a response. However, when the threat is perceived as substantial and urgent, officers are likely to reflexively initiate a response that they have learned, through training and experience, to be an appropriate response to the threat.
5. As part of my professional focus I have interviewed or consulted with firearms instructors from the CIA, Secret Service, FBI, elite police units in the UK and the U.S., including firearms instructors and leaders in the US military including Delta Teams. Two years ago I was in London consulting with a specialist team that was using our research as they were practicing to protect high profile individuals during the London Olympics, from a particular type of terrorist attack. We have conducted research on some of these teams and assessed their reaction times, decision process and memory to a sudden, unexpected and rapidly evolving threat. These exceptionally trained teams, if given the time, engage in decision making that is consciously competent and reasoned. If they are required to react immediately they rely on “pattern recognition” based on their training and experience to know what, where, when and how the threat is going to unfold so they can efficiently and effectively cope with rapidly evolving, highly threatening and time compressed threats.
6. Any attack they or other officers may face can occur very quickly, for example, the movement of an untethered or unholstered gun, rising up to a target, such as by an assailant quickly pointing a gun at an officer. This particular motion has been a topic of scientific inquiry for over a decade (Blair, 2011; Hontz, 1999; Lewinski, 2000; Lewinski, 2002; Lewinski, Dysterheft, Seefeldt, & Pettitt, 2013). An early study by Hontz (1999) found that a subject could move a gun from a bootleg position (held down, beside the leg), raise and fire it in 0.59 seconds. Blair et al (2011) found that a subject raising and firing a gun that was held in the same position as in Hontz’s study accomplished this task in just over one-third of a second. Additionally, Lewinski and the Force Science Institute (2000) found that a subject could point and fire an untethered handgun from a similar bootleg position (held behind the thigh), or placed in a waistband position, or from a position from a console in a car and fired out a vehicle window, would all in approximately 0.25 seconds. A recent study involving an assailant in a vehicle during a simulated traffic stop, demonstrated that the assailant driver could move a weapon from a hidden hand position by the console, and point it towards the officer conducting the traffic stop, in an average time of approximately one-third of a second (Lewinski et al,

2013). Researchers also found that if the officer began to move, forcing the assailant to readjust the gun, the discharge of the assailant's firearm still occurred in under 0.50 seconds (Lewinski et. al, 2013). Overall, the results of these studies demonstrate the movement time from a resting position to a shooting position in untrained individuals, who are simply pointing a handgun and shooting, can range from 0.25 to 0.50 seconds or from a quarter to a half a second. – As a point of reference, in a professional baseball game a fastball will travel from the pitcher's mound to home plate in approximately a half a second.

7. Long barreled weapons such as an AK 47, M 16 or tactical or patrol rifle can be shifted from a low, off target position (pointed downward toward the ground) to an aimed point and fire position in approximately a second. In a study being completed as of this writing Force Science found the mean or average time for this action to be .99 seconds, the S.D. to be .20 and the range to be from a maximum of 1.35 seconds to a minimum of .63 seconds.
8. An officer in an incident such as this one is not a mind reader. After the incident is over, the true nature of the threat and the apparently threatening person might be ascertained, but as it is developing, the officer has to predict the outcome of the situation as they are reading it. Plus they have to engage in whatever course of action they can to react to stop the threat if they can. Most of the officer's behavior in this type of situation is automatic as the officer perceives, judges and then reacts in a trained, reflexive fashion with action that they believe to be life saving and all of this has to occur in an extremely short period of time.
9. The type of decision-making that occurs in this type of situation is similar to a variety of crisis situations across a number of professions including fire fighters, the military, emergency room physicians and even athletes. An officer in this situation would quickly grasp the nature of the threat and then engage in the most reactive and appropriate response. The speed with which the incident is unfolding and the urgency of a need for a response, deprive the officer of the ability to fully and completely process all of the elements in the situation, and then weigh or evaluate a number of choices, etc. Subsequently, given the constraints of this type of encounter, the officer's first response is often perceived in the immediacy of the encounter as their best option.
10. Further, in these types of circumstances, humans who are responding as rapidly as they can to save their life or someone else's cannot simultaneously critically analyze the information they are processing, the behavioral options open to them and some of their actions. Because all of their attentional resources are focused on pushing forward their trained responses, under the immediate urgency to stop the threat, they have little time and few cognitive resources left for review and reflection on their action or the detection of change on the part of the person they are shooting at or the implications of any further movement of the person. This is especially relevant within the very brief period of time and the visual and behavioral complexity of this type of incident.

11. Also, it is a normal part of human behavior for any officer in this type of situation to have a limited perception and then recall about anything else except that on which they are directly and intently focused. For instance in one of our studies (Vickers & Lewinski, 2012) we placed eye scan equipment on a very elite European counter terrorism team and also on regularly trained officers. In the middle of a simulated gunfight, their self selected focus on their weapon or on the person shooting at them had a profound effect on their perception of the incident, shooting accuracy, judgment and memory.
12. In this incident, which was visually complex, dynamic and very threatening, the deputy informed us that he was focused first on the tactical rifle and then the behavior of Mr. Lopez. Mr. Lopez was not immediately responding to the commands and then began to turn, apparently in defiance of the commands, while beginning to raise the barrel of the weapon toward the deputy. Deputy Gelhaus then apparently (based on his interview) shifted his focus to his shooting response, to save his life. Apparently because of his focus on the threat and then his response to that threat he was unable to immediately note whether the apparent weapon in Mr. Lopez's hand even finished its upward arc. The fact it took some time to do this (to start and then to stop his response) and the reported limited perception and memory is a classical example of the limitation of human perception and performance by a very well trained professional operating under high stress conditions such as were present in this incident. In the police world the limitations of this focus of attention are known as "tunnel vision" and "tunnel hearing." In the scientific world they are called selective attention and inattention blindness. An earlier term was "sensory gating." The inability to immediately start and stop in reaction to a stimulus is known as "the reactionary gap."
13. The level of threat and the officer's attentional focus to engage that threat also informs us about the ability of that officer to stop their action. In our research on time to start and stop shooting, conducted under ideal laboratory conditions, the officers, who were engaged in firing as rapidly as they could, knowing that they would have to instantly stop, took approximately a third of a second to recognize the change and stop. This means they fired an additional one to two rounds while detecting the signal that indicated they were to stop and they then completed the action of stopping. This research is available on the Force Science website under Articles. There are several iterations but the simplest version is entitled the "Tempe Study." It is elaborated upon more completely in our peer reviewed article, also on our website, entitled, "New Developments in Understanding the Behavioral Science Factors in the 'Stop Shooting' Response." We are about to submit another analysis on the same topic to a peer-reviewed journal.
14. In our research the stimulus to stop was expected by the officers and was very simply and clearly presented. Again, in a dynamic, real world circumstance, such as this incident, where an officer is uncertain about the behavior, the outcome, or when or even if their action will stop the threat, that officer is going to have a much more difficult time identifying that elements within the incident have changed. In real world research related to recognizing cues while driving and initiating the stopping of a vehicle, a response to an expected signal to stop took seven to eight tenths of a second. A response



to an unexpected cue to stop took a second and a half. Even the shortest time in real world research to recognize a cue to stop, begin to stop and then completely stop an action took the equivalent for an officer in a shooting situation of three trigger pulls. No one can start or stop anything instantly particularly when they are reacting to the behavior of others. The reader might note that every intersection that has a stoplight has an amber warning light that precedes the onset of the red light. This is done to warn the driver that they will soon have to stop. In the U.K. they also have a amber to warn the driver that a green light is about to be illuminated. All of this facilitates the flow of traffic both to start and stop.

15. Expecting an officer in this situation to note the movement of a person while they were shooting to stop the threat is the equivalent to asking a batter to determine the location and movement of the pitcher or the pitcher's non throwing hand, while they are attempting to hit a fastball in a professional baseball game – as the ball is coming toward them. Therefore, from the Force Science peer reviewed research on attention and perception and the well founded principles that undergird that research we can state that an officer who is focused intently on shooting to stop a threat, like a batter in an important game, is not likely to note anything else except that on which they are directly and intently focused. Subsequently they would also be unable to immediately stop any action they had just started.
16. Similarly, Deputy Gelhaus informed us that he was attentionally focused on attempting to avoid being shot and shooting to prevent any injury to himself and his partner. In the brevity of this encounter he was aware that it all occurred very quickly. He apparently was so focused on avoiding being injured and shooting to respond to the perceived threat that he could not report on precisely where his shots went and the location and angle at which his bullets struck Mr. Lopez. That was until he detected Mr. Lopez was no longer a threat to him and then he stopped shooting.
17. Research during the last half century, informs us that once a well trained person intently focuses on something, it becomes very difficult for them to simultaneously focus on other things. In the civilian world the reader might consider all of the research on the use of cell phones and driving. In the police world, this includes our own peer reviewed research on attention conducted in London, England, and our research in Belfast which used sophisticated eye scan equipment that has been used on Olympic and professional athletes, and can also be seen in our study on focus, attention and exhaustion with Winnipeg Police. The liabilities of focused attention also includes an extreme difficulty in the ability to immediately detect and react to something on which the officer is not focused.
18. The implications of the limitations of perception and attention and the delay in an immediate stopping time ~ is that an officer who is genuinely shooting until the threat stops, will despite their best efforts, continue to fire a number of shots while a person is initiating a fall and then falling toward the ground. This can result in bullet path patterns that may seem unusual, such as downward or upward shots through the torso.

19. An illustration out of athletics for this phenomenon is the concept of the fake or juke. Every time an offensive player jukes and a defensive player is "faked out" the reason is that the defensive player had to read and anticipate an interception point with the offensive player and missed the point. By time the defensive player commits to an action the offensive player has changed their action and the defensive player cannot stop the action they are committed to in time to set up another more appropriate intercept point. This is a well studied phenomenon in the world of perception/cognition and well used in athletics, driving, the airline industry, etc. and utilizes the principles that all action takes time, action often beats reaction, even the briefest decision and action take time and stopping an action is something that cannot be done immediately. As noted in the time to stop article with Redmann, no human can stop something immediately, whether it be in shooting, driving or athletics.

## **DURATION OF THE SHOOTING:**

1. Lewinski (2008) (2014) found that an officer's ability to perceive the initiation and then ending of a threat is based on the officer's attention to the specific activities in an event that would elicit a perception about the beginning and then the ending. Vickers and Lewinski (2012) found that it was not just the attentional process but also the specific location of the officer's gaze that determined their ability to perceive an evolving threat and respond, or the cessation of that threat and then a termination of their response. This means that an officer is going to start shooting when they independently perceive a threat and stop shooting when they realize the threat has ceased. This realization takes time and requires a specific visual focus to detect. An illustration in this incident is the perception/detection of Mr. Lopez and then each deputy's positioning/decision/action in this incident, based on their perception, understanding of the threatening action and then their individual response pattern to that threat. For instance Deputy Schemmel was in the driver's seat. Getting out of the passenger side of a squad car as Deputy Gelhaus did is a much faster action than getting out of the driver's side of a squad car, as Deputy Schemmel did. This is primarily because of the obstruction of the steering wheel, the duty belt of the officers and the general cramped quarters of the driver's side. Both deputies came to the same decision and response to the apparent threat but arrived at their responses to that threat at different times, with Deputy Schemmel reportedly arriving at the start of his response about the time Deputy Gelhaus was completing his.
2. From the research on assailant behavior in a shooting situation, which has been referred to previously, the average time for an assailant to point and fire a long barreled weapon – at this distance, where a gun doesn't necessarily need to be aimed – is approximately a second. However, an average officer who has already decided to shoot, can't react and complete the defensive act of shooting (aligning a gun on target, aiming and then shooting), in response to an evolving threat, for seven tenths of a second or longer. If the officer has to bring their weapon on target and aim it as Deputy Gelhaus said he did, then it would take the average officer over a second to respond to the threat of a long barreled weapon being pointed at them.

3. Therefore, from a behavioral science perspective, if Mr. Lopez had the weapon he was perceived to have and the intent to fire on the officers as was perceived and Deputy Gelhaus had not responded, but waited until Mr. Lopez had actually started to point or point and fire his perceived AK47 ~ by the time Deputy Gelhaus could respond with gunfire, if Deputy Gelhaus was still able to ~ he could be shot at multiple time before he could respond back and fire one shot.
4. The average officer can fire a short stroke semi-automatic handgun at a cadence of a quarter of a second per round. (Lewinski & Hudson, 2003) (Bumgarner, Lewinski et al, 2005) (Lewinski et al. 2014). This means that if the first bullet fired started the timing, an officer firing five rounds would fire all five shots in one second. An average officer who has practiced using a shorter stroke, semi-automatic handgun such as the Smith and Wesson, M&P 9 used in this incident, can rapidly fire at a cadence of approximately a quarter of a second per shot, especially in a reasonably close encounter. Therefore in this instance an average officer firing rapidly at the distance of this incident could have fired all eight shots in approximately one and three quarters of a second or less. We do not have any indication that Deputy Gelhaus did anything other than align and shoot as quickly as was possible until he detected that Mr. Lopez was no longer a threat. If that were the case then the average time of one and three quarter seconds is relevant. However given the training and experience of Deputy Gelhaus the duration of gunfire may have been even shorter.

## CONCLUSION:

Given that Deputy Gelhaus identified the replica assault rifle (absent of any markings to identify it as a replica) as a actual assault rifle with a ballistic capability that would penetrate his vehicle and vest; given that he gave commands which were not complied with; given that Mr. Lopez then turned toward him and whether inadvertently or not began to elevate and point the barrel of the gun toward the officers - from a behavioral science perception and an action/reaction paradigm Deputy Gelhaus had to respond to stop the perceived threat. Further, if Deputy Gelhaus had waited to confirm that the weapon being pointed in his direction was an actual weapon and it was, he and his partner could be shot multiple times before he could respond.

If I can provide any further information, please contact me. I reserve the right to amend this report should further information become available to me.

Sincerely,

A handwritten signature in black ink, appearing to read 'W. J. Lewinski', with a horizontal line underneath.

William J. Lewinski, Ph.D.

# **APPENDIX E**



## CURRICULUM VITAE

### REESE T. JONES, M. D.

Professor Emeritus  
Department of Psychiatry  
School of Medicine  
University of California, San Francisco  
San Francisco, California 94143

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#### *Education*

1950-54	University of Michigan, Psychology Honors Program		
1954-58	University of Michigan, Medical School	Student	M.D.
1958-59	Philadelphia General Hospital	Intern	Rotating General
1959-61	National Institute of Mental Health, NIH	Physician	Psychopharmacology
1961-62	University of California, San Francisco	Resident	Ob-Gyn, Anesthesiology
1962-65	University of California, San Francisco	Resident	Psychiatry
1965-67	University of California, San Francisco	Sr. Resident	Psychiatry

#### *Positions and Appointments*

1959-61	National Institute of Mental Health	Research Physician	Psychopharmacology
1967-72	University of California, San Francisco	Assistant Professor	Psychiatry
1972-77	University of California, San Francisco	Associate Professor	Psychiatry
1977-2011	University of California, San Francisco	Professor	Psychiatry
2011-present	University of California, San Francisco	Professor Emeritus	Psychiatry

#### *Licensure and Certifications*

California Medical License, 1961  
American Board of Psychiatry and Neurology, Diplomate (Psychiatry), 1969

#### *University Service*

Committee on Human Research (IRB), University of California, San Francisco, 1974 to 1978; Chair,  
1988 to present

#### *Other Positions and Service*

##### *Federal and State*

2005-2014	National Institute on Drug Abuse	Data Safety Monitoring Board Member
2004	National Institutes of Health	Ethics Research Grant Review Committee
2001-2005	National Institute of Drug Abuse	Ad Hoc Grant Reviewer, at six IRG meetings
2000	National Institute on Drug Abuse	Medication Development Research Subcommittee
1996-1999	National Institute on Drug Abuse	National Advisory Council on Drug Abuse

1993-1996	National Institute on Drug Abuse	Board of Scientific Counselors of the Addiction Research Center
1993-1996	National Institute on Drug Abuse	Extramural Science Advisory Board
1987-1993	NIH General Clinical Research Center Program	Ad Hoc Reviewer (seven site visits)
1990-1992	NIH Office of Scientific Integrity	Expert Advisory Panel
1982-1986	Food on Drug Administration	Drug Abuse Advisory Committee
1983-1985	Veterans Administration	Merit Review Board for Mental Health and Behavioral Sciences
1982-1985	National Research Council	Committee on Toxicology, Panel on Psychochemicals
1980-1981	National Academy of Sciences, IOM	Committee for Study of Health-Related Effects of Marijuana Use
1975-1979	National Institute on Drug Abuse	Drug Abuse Study Section Member
1978-1982	American Cancer Society	Advisory Committee on Clinical Investigations
1974-1977	National Academy of Science	MRC, Committee on Vision
1970-1974	National Institute of Mental Health	Small Grants Study Section Member
2005-2014	NIDA and NIH	Frequent (2/year or more) ad-hoc reviewer on K, Center and Translational research review Committees

### ***Military Service***

U.S. Public Health Service Commissioned Corps, Senior Surgeon, Stationed NIH, Bethesda, 1959 to 1961

### ***Scholarships and Fellowships***

Regents Scholarship, University of Michigan, 1953  
 U.S.P.H.S. Medical Student Research Fellowship, 1954 to 1958  
 NIMH Research Scientist Development Award, 1967 to 1977

### ***Other Awards and Achievements***

Morton Prince Award, American Psychopathological Association, 1973  
 NIH and NIDA Research Scientist Awards, 1977 to 2009

### ***Professional Organizations***

1972-2014, American College of Neuropsychopharmacology (Fellow Emeritus)  
 1976-2014, Collegium Internationale Neuro-Psychopharmacologicum (Fellow Emeritus)  
 1993-2014, College on Problems of Drug Dependence (Fellow)

### ***Editorial Activities***

1995- 2005 National Institute on Drug Abuse Editorial Advisors Board  
 1983-1988 Editorial board, Annual Review of Medicine  
 1975-1991 Editorial Board, National Institute on Drug Abuse Research Monograph Series  
 1972-1989 Advisory Board, Psychopharmacology  
 1972-1988 Editorial Board, Quarterly Journal of Studies on Alcohol  
 1970-1988 Editorial Advisory Board, Schizophrenia Bulletin

2000-2014 Ad hoc referee for Drug and Alcohol Abuse, Biological Psychiatry, Neuropsychopharmacology, Psychopharmacology, JAMA, Archives of General Psychiatry, Science, Psychophysiology.

### ***Personal Publications***

#### ***A. Original Investigations and Theoretical Treatises***

1. Herbst ED, Harris DS, Everhart ET, Mendelson J, Jacob P, Jones RT. Cocaethylene formation following ethanol and cocaine administration by different routes. *Exp Clin Psychopharmacol.* 19(2):95-104, 2011
2. Li L, Everhart T, Jacob, III P, Jones R, Mendelson J. Stereoselectivity in the human metabolism of methamphetamine. *Br J Clin Pharmacol.* 69(2):187-92, 2010
3. Harris DS, Everhart T, Jacob P 3rd, Lin E, Mendelson JE, Jones RT. A phase 1 trial of pharmacologic interactions between transdermal selegiline and a 4-hour cocaine infusion. *BMC Clin Pharmacol.* 9:13, 2009
4. Jones, R.T., Hallucinogen-Related Disorders. In: *Comprehensive Textbook of Psychiatry*, Chapter 11.7. Saddock BJ, Kaplan VA, Ruiz P, Eds., Philadelphia: Lippincott Williams and Wilkins, pp. 1238-1247, 2009.
5. Mendelson JE, McGlothlin D, Harris DS, Foster E, Everhart T, Jacob P 3rd, Jones RT. The clinical pharmacology of intranasal l-methamphetamine. *BMC Clin Pharmacol.* 8:4-9, 2008.
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11. Harris, D.S., E.T. Everhart, J. Mendelson, and R.T. Jones. The pharmacology of cocaethylene in humans following cocaine and ethanol administration. *Drug and Alcohol Dependence*, 72:169-182, 2003.
12. Harris, D.S., V.I. Reus, O.M. Wolkowitz, J.E. Mendelson, and R.T. Jones. Altering cortisol level does not change the pleasurable effects of methamphetamine in humans. *Neuropsychopharmacology*, 28:1677-1684, 2003.

13. Harris, D.S., H. Boxenbaum, E.T. Everhart, G. Sequeira, J.E. Mendelson, and R.T. Jones. The bioavailability of intranasal and smoked methamphetamine. *Clinical Pharmacology and Therapeutics*, 74:475-486, 2003.
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