IN THE CIRCUIT COURT OF PULASKI COUNTY, ARKANSAS
FOURTH DIVISION

LEDELL LEE **PETITIONER**

v. **CR 93-1249**

STATE OF ARKANSAS **RESPONDENT**

MOTION FOR POST-CONVICTION DNA TESTING PURSUANT TO ARKANSAS CODE ANNOTATED §§ 16-112-201, *ET SEQ* AND REQUEST FOR HEARING

Petitioner Ledell Lee ("Mr. Lee" or "Petitioner"), through undersigned counsel, respectfully petitions this Court for an order directing forensic DNA testing of biological evidence collected during the investigation of the murder of Debra Reese pursuant to Arkansas's Habeas Corpus – New Scientific Evidence Statute (the "Statute") (codified at Ark. Code Ann. §§ 16-112-201, *et seq*.), and the Due Process and Cruel and Unusual Punishment Clauses of the Fifth, Eighth and Fourteenth Amendments to the United States Constitution. DNA testing of evidence is required if testing or retesting can provide materially relevant evidence that will significantly advance the defendant's claim of innocence in light of all the evidence presented to the jury. *Johnson v. State*, 356 Ark. 534, 546, 157 S.W.3d 151, 161 (2004).

PRELIMINARY STATEMENT

Mr. Lee has consistently asserted his innocence and denied any involvement in the 1993 murder of Debra Reese. Today, probative biological evidence currently in the custody and control of the State may now be able to provide—through the use of modern, cutting edge DNA testing technologies—confirmation of the veracity of Mr. Lee's innocence claim. This testing is available at no cost to the State as the Innocence Project has agreed to pay the costs of private testing by a qualified and fully accredited laboratory. *See* AR Code § 16-112-208(A)(2).

Mr. Lee seeks to test residual biological evidence on Converse tennis shoes in the custody of the State seized from the defendant on the day of the crime. The State's expert testified that this biological evidence found on the shoes was blood, but that he was unable to conduct further testing to determine the origin of the blood. At Mr. Lee's trial, the State asked the jury to infer that the positive results of the blood testing supported its contention that Mr. Lee had murdered Ms. Reese. Mr. Lee further seeks to test a hair collected at the crime scene and identified by the state's expert at trial as one "intact Negroid head hair," and hair "fragments" also collected from the scene; the jury was told that the state's expert could not include or exclude the defendant as the source of these hairs. This hair and blood evidence was not previously subjected to DNA testing by the State or by Mr. Lee.

However, today's advanced DNA testing methods can now provide definitive answers to the questions that could not be resolved by the State's experts at trial. Indeed, this previously-unavailable testing could now demonstrate that the blood on the shoes was *not* Ms. Reese's, and that the hairs of African American origin found at the scene were *not* Mr. Lee's. Further, if a sufficient quantity of "root" (tissue) material is present on the hairs, and a DNA profile is obtained that excludes Mr. Lee as the source, the profile can be searched in the national CODIS DNA databank and potentially identify Ms. Reese's actual killer. As discussed *infra*, modern DNA technology has been used in numerous cases to exonerate innocent defendants who were sent to prison or death row on the same kinds of limited serology and hair evidence offered by the State against Mr. Lee, after DNA testing provided more definitive and accurate results.

DNA testing is perfectly suited for cases like this one, where technology unavailable at the time of trial can conclusively establish the legitimacy of a Petitioner's innocence claim and undermine evidence used to convict. As the Supreme Court has recognized, "DNA testing has

an unparalleled ability both to exonerate the wrongly convicted and to identify the guilty . . . [t]he Federal Government and the States have recognized this, and have developed special approaches to ensure that this evidentiary tool can be effectively incorporated into established criminal procedure." *Dist. Attorney's Office for Third Judicial Dist. v. Osborne*, 557 U.S. 52, 55, 129 S. Ct. 2308, 2312, 174 L. Ed. 2d 38 (2009).

Accordingly, Mr. Lee respectfully requests that this Court grant his application for post-conviction DNA testing. In support of this motion petitioner submits the Declaration of Ledell Lee (Exhibit 1) and Affidavit of Charlotte J. Word, Ph.D (Exhibit 2).

PROCEDURAL HISTORY[1]

Petitioner was charged with the capital murder of Debra Reese on February 9, 1993.

On October 4, 1994, at a capital trial, the Circuit Court granted a mistrial after the jury could not reach a unanimous verdict on petitioner's guilt/innocence.

At his second trial on October 12, 1995, petitioner was found guilty of capital murder and was sentenced to death on October 16, 1995.

The Supreme Court of Arkansas affirmed the conviction and sentence on March 24, 1997. *Lee v. State*, 327 Ark. 692, 942 S.W.2d 231 (1997). The only issue raised with respect to the purported blood evidence on the tennis shoes pertained to the destruction of the blood samples.

Petitioner subsequently filed a petition for postconviction relief pursuant to Arkansas Rule of Criminal Procedure 37 in which he alleged that his trial attorneys had rendered ineffective assistance of counsel during the guilt and penalty phases of his trial. The circuit court held two separate hearings on the matter, on January 20 and 21, 1999, and on March 30, 31

[1] Petitioner hereby incorporates by reference all of the court opinions cited below and asks the court to take judicial of all filings and issues raised within these pleadings.

and April 1, 1999. Following these hearings, the circuit judge denied Lee's petition, and the Arkansas Supreme Court affirmed. *Lee v. State*, 343 Ark. 702, 38 S.W.3d 334 (2001).

Lee then filed a Petition for Writ of Habeas Corpus in federal court. On April 2, 2003, United States District Judge George Howard, sua sponte, noted that Lee's attorney may have been impaired to the point of unavailability on one or more days of the Rule 37 hearing. He ordered the petition stayed and held in abeyance, remanding to the trial court to take appropriate action to allow Lee to present relevant evidence and argument in favor of his Rule 37 petition issues. The Eighth Circuit affirmed the stay. *Lee v. Norris*, 354 F.3d 846 (8th Cir. 2004).

On August 30, 2005, Petitioner moved the Arkansas Supreme Court to recall its mandate on grounds that his attorney in the postconviction proceedings rendered ineffective assistance of counsel. Petitioner maintained, and the Supreme Court later found, that his postconviction attorney suffered from a substance-abuse problem and had been intoxicated during the initial Rule 37 proceedings in 1999. As a result, the Arkansas Supreme Court granted Petitioner's motion to recall the mandate and remanded the matter to the circuit judge for further proceedings. *Lee v. State*, 367 Ark. 84, 238 S.W.3d 52 (2006).

On remand, petitioner filed an amended petition for postconviction relief under Arkansas Rule of Criminal Procedure 37. The circuit judge held another hearing on August 28, 2007, and subsequently denied Lee's petition and entered findings of fact and conclusions of law on November 21, 2007. Lee appealed to the Arkansas Supreme Court which affirmed the lower court. *Lee v. State*, 2009 Ark. 255, 308 S.W.3d 596 (2009).

During the above proceedings, on September 18, 2008, the Supreme Court of Arkansas denied a pro se motion of defendant. *Lee v. State*, 2008 Ark. LEXIS 447 (2008), because he was not entitled to accept appointment of counsel and also proceed pro se.

On November 9, 2008, the United States Supreme Court denied *certiorari* to Lee in connection with the Second Rule 37 petition. *Lee v. Arkansas*, 558 U.S. 1013 (2009).

On June 18, 2013, United States District Judge Jimm Larry Hendren denied Lee's Petition for Writ of Habeas Corpus. *Lee v. Hobbs*, 2013 U.S. Dist. LEXIS 85271, 2013 WL 3149755 (E.D. Ark. 2013). On December 18, 2013, Judge Hendren denied Lee's Motion to Vacate, Alter or Amend Judgment Pursuant to Rule 59(e). *Lee v. Hobbs*, 2013 U.S. Dist. LEXIS 177403, 2013 WL 6669843 (E.D. Ark. 2013).

The Eighth Circuit denied relief to Lee and a petition for rehearing en banc was denied. *Lee v. Hobbs*, 2014 U.S. App. LEXIS 22121 (8th Cir. 2014). The United States Supreme Court denied certiorari. *Lee v. Kelley*, 2015 U.S. LEXIS 6544 (Oct. 13, 2015).

Lee is scheduled for execution on April 20, 2017. On April 15, 2017, the Eastern District of Arkansas entered an order staying Mr. Lee's execution, along with several others, because of problems with the execution drug midazolam. *McGehee et al. v. Hutchison*, et al., No. 4:17-cv-179-KGB (E.D. Ark. April 15, 2017). The State has filed a Notice of Appeal. The Circuit Court of Pulaski also entered a temporary order staying all executions pending a preliminary hearing set on Tuesday, April 18, 2017 regarding another of the execution drugs. *McKesson Medical-Surgical Inc. v. State of Arkansas*, No Civ. 17-1921 (Order April 15, 2017). The State is also seeking review from the Arkansas Supreme Court of the Circuit Court order.

STATEMENT OF FACTS

The exonerating potential of DNA testing in this case must be considered in tandem with the limited circumstantial evidence used to convict Mr. Lee and sentence him to die. Ms. Reese was found murdered in her home in Jacksonville, having been strangled and beaten with a tool belonging to her that resembled a baseball bat. Three eye witnesses identified Mr. Lee as the

man they believed they saw in Ms. Reese's neighborhood on the morning of her murder. One of the three identified Mr. Lee entering Ms. Reese's home, and exiting 20 minutes later looking suspicious because of "rapid-head movements." Ms. Reese called her mother that morning and told her that a man had just knocked on the door, asked if her husband was home, and inquired about borrowing some tools. When Ms. Reese replied that she had no tools, the man left. Ms. Reese told her mother that she was scared and did not trust this guy. Three hundred dollar bills given to her by her father were missing from Ms. Reese's wallet. Later that day, Mr. Lee paid a debt with a one-hundred dollar bill that bore a serial number within two digits of serial numbers on bills that Ms. Reese's father turned over to police. *Lee v. Arkansas*, 327 Ark. 692, 942 S.W.2d 231, 232-33 (1997).

The State introduced no confession and no physical evidence that directly tied Mr. Lee to the murder of Ms. Reese. None of the lifted prints from the crime scene matched the defendant and no DNA evidence was presented to the jury. To strengthen the weak circumstantial evidence, the State introduced evidence of "small spot[s]" of blood found on Mr. Lee's Converse tennis shoes at the time of his arrest. Notwithstanding an extremely bloody crime scene, however, no other blood was discovered on Mr. Lee's clothes. According to the Arkansas Supreme Court,

> When Lee was arrested and taken into custody on the day of the murder, among the items police seized from him was a pair of Converse tennis shoes he was wearing. Kermitt Channell, a serologist with the State Crime Lab, examined the shoes and observed what he believed to be a small spot of blood on the sole of the left shoe, and another spot on the tongue of the right shoe. Channell performed what he termed a "Takayama test" on the shoes, which confirmed the presence of blood, but consumed the entire sample, thus removing the opportunity for independent analysis by the defense.

Id., 327 Ark. at 699, 942 S.W.2d at 234. Channel testified at trial that he performed the confirmatory blood test on the shoes in accordance with established laboratory guidelines, but acknowledged that he had not contacted the prosecutor or the defense counsel in advance to

inform them that the sample on the shoes could be consumed. *Id.*, 327 Ark. at 700-01, 942 S.W.2d at 235. Significantly, the Arkansas Supreme Court denied relief because "Lee has made no showing that the blood evidence on the shoes possessed any exculpatory value before it was destroyed." *Id.*, 327 Ark. at 701, 942 S.W.2d at 235.

Donald E. Smith, a criminalist, testified for the State as an expert witness with respect to hair evidence retrieved from the crime scene. Specifically, he analyzed one "intact Negroid head hair" and several Negroid hair fragments. Tp. 688. He also indicates the intact hair has a root present. Tp. 690. ("And I saw some clearing of the pigments because from the root to the shaft there sometimes gets a clearing of this pigmentation. That's not apparent if you don't have roots.") At the time of the trial in 1995, Mr. Smith said "hair is not a science so precise that you can define a hair as uniquely coming from an individual, saying that no other individual has hair like another person." Tp. 685. After an examination of these hairs, Mr. Smith concluded that he found nothing that was inconsistent with Petitioner's hair but that he couldn't identify them as coming from the defendant. Tp. 690. Now, because of advances in DNA testing, Mr. Lee can refute the hair and blood evidence that served as the lynchpin for his conviction, by proving that the biological evidence on the shoes was not the blood of Debra Reese, and that the hair was not his. In closing the prosecutor emphasized the importance of the identification of some Negroid hair fragments consistent with the defendant's and in contrast to the Caucasian head hairs of Debra Reese and her husband. Tp. 773. The prosecutor acknowledged the defendant's clothes had no blood on it three hours after the crime but emphasized two pinpoints of blood found at the same time on the defendant's tennis shoes Tp. 773, 795. The blood and hair evidence were an essential part of the State's case identifying the defendant as the perpetrator of the murder.

ARGUMENT

The Arkansas General Assembly passed Act 1780 to address mounting concerns regarding persons who were jailed, and sometimes executed, for crimes they did not commit. *See* 2001 Ark. Acts 1780 ("[a]n Act to provide methods for preserving DNA and other scientific evidence and to provide a remedy for innocent persons who may be exonerated by this evidence."); *see also Echols v. State*, 350 Ark. 42, 44, 84 S.W.3d 424, 426-7 (2002); *Johnson v. State*, 356 Ark. 534, 157 S.W.3d 151 (2004). The amendment was passed "to accommodate the advent of new technologies enhancing the ability to analyze scientific evidence" and further the "mission of the criminal justice system [which] is to punish the guilty and exonerate the innocent." Act 1780, § 1.

Almost twenty-two years after the start of the Petitioner's trial, the refined capacities of modern DNA testing can now be applied to the blood found on Mr. Lee's shoes, and potentially prove Petitioner's innocence. Given Petitioner's not guilty plea at his earlier trial, his battle to prove his innocence, and the State's underwhelming case against him, the remedy of DNA testing is particularly compelling.

Under the Act, an Arkansas petitioner may make a motion for forensic DNA testing if:

> (1) The specific evidence to be tested was secured as a result of the conviction of an offense's being challenged under § 16-112-201;
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> (3) The specific evidence was previously subjected to testing and the person making a motion under this section requests testing that uses a new method or technology that is substantially more probative than the prior testing;
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> (4) The specific evidence to be tested is in the possession of the state and has been subject to a chain of custody and retained under conditions sufficient to ensure that the evidence has not been substituted, contaminated, tampered with, replaced, or altered in any respect material to the proposed testing;
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> (5) The proposed testing is reasonable in scope, utilizes scientifically sound methods, and is consistent with accepted forensic practices;

(6) The person making a motion under this section identifies a theory of defense that:

(A) Is not inconsistent with an affirmative defense presented at the trial of the offense being challenged under § 16-112-201; and

(B) Would establish the actual innocence of the person in relation to the offense being challenged under § 16-112-201;

(7) The identity of the perpetrator was at issue during the investigation or prosecution of the offense being challenged under § 16-112-201;

(8) The proposed testing of the specific evidence may produce new material evidence that would:

(A) Support the theory of defense described in subdivision (6) of this section; and

(B) Raise a reasonable probability that the person making a motion under this section did not commit the offense;

(9) The person making a motion under this section certifies that he or she will provide a deoxyribonucleic acid (DNA) or other sample or a fingerprint for comparison; and

(10) The motion is made in a timely fashion subject to the following conditions . . .

(B) There shall be a rebuttable presumption against timeliness for any motion not made within thirty-six (36) months of the date of conviction. The presumption may be rebutted upon a showing . . . .

(iv) That a new method of technology that is substantially more probative than prior testing is available;

As all of these criteria are satisfied here, Petitioner requests that his motion for post-conviction forensic DNA testing be granted.

I. PETITIONER IS ENTITLED TO DNA TESTING PURSUANT TO ARK. CODE ANN. §§ 16-112-201 *ET SEQ*.

A. The Physical Evidence in This Case Was Secured as a Result of Petitioner's Conviction and the Proposed DNA Testing May Produce New Material Evidence That Would Raise a Reasonable Probability That Mr. Lee is Innocent of Capital Murder

All of the evidence Petitioner seeks to submit to DNA testing was obtained during the police investigation of the murder of Debra Reese. The biological evidence found on Mr. Lee's shoes and the Negroid hair and hair fragments found at the crime scene—if subjected to the

requested DNA testing procedures detailed below—has the capacity to produce new material evidence that would substantiate Mr. Lee's prior not guilty plea by proving his actual innocence and demonstrating that Mr. Lee is innocent of this crime.

In accordance with § 16-112-202(6)(B) & (8)(B), the Arkansas Supreme Court has held that DNA testing of evidence is authorized if testing or retesting can provide materially relevant evidence that will significantly advance the defendant's claim of innocence in light of all the evidence presented to the jury. *Johnson v. State*, 356 Ark. 534, 546, 157 S.W.3d 151, 161 (2004). Such evidence need not completely exonerate the defendant in order to be "materially relevant," but it must tend to significantly advance his claim of innocence. *King v. State*, 2013 Ark. 133, 4-5 (2013).

Petitioner is also entitled to relief under the United States Supreme Court's decision in *Schlup v. Delo*, 513 U.S. 298 (1996). In *Schlup*, the Court held that a petitioner can demonstrate actual innocence by producing newly discovered evidence that makes it "more likely than not that no reasonable juror would have found [him] guilty beyond a reasonable doubt." *Id.* at 327; *accord*, *House v. Bell*, 547 U.S 518 (2006). Moreover, because a *Schlup* "claim involves evidence the trial jury did not have before it, the inquiry requires the . . . court to assess how reasonable jurors would react to the overall, newly supplemented record." *Id.*

As described in more detail *infra*, DNA testing on the tennis shoes collected in this case and the hair evidence could establish Mr. Lee's innocence.

B. All of the Physical Evidence in This Case is Currently in the Possession of the State, Has Been Subject to a Chain of Custody and Retained Under Conditions Sufficient to Ensure that the Evidence has not Been Substituted, Contaminated, Tampered With, Replaced, or Altered in Any Respect Material to the Proposed DNA Testing.

The Converse tennis shoes seized from the defendant on the day of the murder and the hair evidence seized from the crime scene have been presumably held by the State since 1993,

have been subject to a chain of custody, and have been retained under circumstances to prevent contamination. There is no evidence demonstrating or reason to believe that the remaining biological evidence has been in any way compromised.

C. The Petitioner's Proposed Testing of the Physical Evidence is Scientifically Sound, Consistent With Accepted Forensic Practices, Reasonable in Scope, and Includes New Forms of DNA Testing That Are Substantially More Probative Than Prior Testing Technologies, Thus Rebutting the Presumption Against Timeliness.

As will be discussed *infra,* new forms of forensic DNA testing that did not exist and were entirely unavailable at the time of Petitioner's first and second trials, and others that are substantially more probative than the DNA methods available at Mr. Lee's 1995 trial can now be deployed to analyze the collected biological evidence.

1. The proposed DNA testing is scientifically sound and consistent with accepted forensic practices and the technology to be used is substantially more probative than the technologies used at Mr. Lee's trial..

Forensic DNA testing methodologies have not been considered "novel science" in Arkansas since 1996 and have been admissible evidence since 1991. *Moore v. State*, 323 Ark. 529, 915 S.W.2d 284 (1996); *Engram v. State*, 341 Ark. 196, 15 S.W.3d 678 (2000); *Whitfield v. State*, 346 Ark. 43, 45, 56 S.W.3d 357, 358 (2001) (citing *Prater v. State*, 307 Ark. 180, 820 S.W.2d 429 (1991)). Indeed, today's forensic DNA testing methodologies are inarguably more sensitive, discriminating, and accurate than almost any other form of evidentiary proof. *See Maryland v. King*, 133 U.S. 1958, 1964 (2013) ("The only difference between DNA analysis and fingerprint databases is the unparalleled accuracy DNA provides.").[2]

[2] The RFLP form of DNA testing used at the time of the Petitioner's trial had extremely limited capabilities and is now obsolete within the forensic DNA context. "[T]he ability of laboratories to perform DNA typing methods has improved dramatically . . . due to rapid progress in the areas of biology, technology, and understanding of genetic theories. In addition, the power of discrimination for DNA tests has steadily increased in the late 1990s." John M. Butler, Forensic DNA Typing 11-12 (2d Ed. 2005); see also Exh. 2at ¶ 7 (Word aff).

At the time of Mr. Lee's trial in 1995, today's advanced methods of STR DNA analysis were unavailable. Exh.2 at ¶ 3, 8-11(Word aff). Short Tandem Repeat ("STR") "increas[ed] exponentially the reliability of forensic identification over earlier techniques" and is "qualitatively different from all that preceded it." *Harvey v. Horan*, 285 F.3d 298, 305, n.1 (4th Cir. 2002). STR testing fully replaced other DNA testing methods in the FBI crime laboratory and most other crime laboratories by 2000.[3] Today, autosomal (non-sex determining) STR technology is the principal mechanism for obtaining DNA profiles in forensic laboratories around the nation, and is essentially the gold standard of modern DNA testing.[4] For a decade, the forensic science community used a minimum of thirteen genetic markers, referred to as the thirteen core CODIS (Combined DNA Index System) loci, when conducting forensic DNA testing.[5]

Since Mr. Lee's trial, there have been major advances in DNA testing capabilities. While Mr. Channell testified that his analysis of the pinpoints of blood consumed the evidence, STR DNA tests require smaller amounts of material than conventional serology analysis. In fact the Affidavit of Dr. Charlotte Wood indicates that DNA tests may be done on profiles from 20 cells or less and that using today's technology, the Converse shoes can be examined for minute

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[3] Butler, supra, 11-12.

[4] Butler, supra, 11-12.

[5] The Combined DNA Index System, or CODIS, is the FBI's nationwide DNA database. The database contains DNA profiles collected by federal and state forensic laboratories. As of August 2013, CODIS contained approximately 10,535,300 offender profiles and 509,900 forensic profiles from crime scenes and produced over 219,700 profile "hits" assisting in more than 210,700 investigations. See Federal Bureau of Investigation, National DNA Index System Statistics, http://www.fbi.gov/about-us/lab/codis/ndis-statistics. Arkansas has its own CODIS compatible DNA database which has over 75,000 convicted offenders in the system and over 82,000 total profiles. This constitutes an average of 15 hits a month in Arkansas due to CODIS. See Arkansas State Crime Lab, CODIS, http://www.crimelab.arkansas.gov/sectionInfo/Pages/codis.aspx.

deposits of blood for DNA testing. This testing could not have been performed prior to Mr. Lee's trial.

2. The hair analysis performed by the criminalist in 1995 was flawed and the availability of mitochondrial DNA testing can prove the hairs found at the scene of the crime do not belong to Mr. Lee.

At the time of the petitioner's trial, the microscopic hair comparison done by Mr. Smith and presented to the jury was a commonly-used but unvalidated forensic technique – one that has since been entirely replaced by mitochondrial DNA analysis as a method of forensic identification. Under the microscope analysis method, an analyst would place two hairs (a crime scene hair and a known hair) side-by-side under a microscope and visually compare them to determine whether there was a positive association. However, in 2009, after Congress assigned the National Academy of Sciences ("NAS") the task of evaluating the scientific validity and reliability of various forensic techniques, including hair microscopy, the NAS published a seminal report that revealed fundamental flaws in many forensic disciplines and the dangers of testimony regarding such "science." Nat'l Academy of Sciences, Nat'l Research Council, Strengthening Forensic Science in the United States: A Path Forward (2009). The NAS found that hair microscopy cannot uniquely identify one person as the source of a hair, concluding that evidence of a match "must be confirmed using [mitochondrial] DNA analysis." *Id.* at 161.

Mitochondrial DNA testing ("mtDNA") analyzes DNA found in the cytoplasm of the cell; that is, the area that surrounds the nucleus. The mitochondrial genome, which is unchanged as it is passes from mother to child, is passed on to all the offspring of a mother and to those children's offspring. Mitochondrial DNA testing thus provides one particular advantage over STR testing; it can be compared to forensic samples that do not have the nucleated chromosomal information required for STR, and thus may be used on biology without nucleated cells,

including hair with no "root," and bones. Mitochondrial DNA can exclude an individual as the source of the hair. Mitochondrial DNA testing was not available to either the State or Mr. Lee in 1995. *See* Exh. 2, Word aff. at ¶8. In 2012, three men who were convicted based on false hair comparison testimony by three different FBI hair examiners were exonerated when post-conviction mitochondrial DNA testing discredited the evidence proffered against them at trial.[6] The NAS Report and the DNA exonerations compelled the Department of Justice and the FBI to re-examine thousands of criminal cases between 1985 and 2000 where its hair examiners conducted microscopic hair analysis and testified to a positive association between a defendant's hair and a hair collected from a crime scene. In April, 2015, as a result of this historic review, the FBI formally acknowledged that nearly every examiner in its microscopic hair comparison unit gave flawed and exaggerated testimony in more than 95% of the trials reviewed.[7] The FBI conceded for the first time that its agents lacked any scientific basis when they testified that an individual was likely the source of a crime scene hair and that hair microscopy is limited "in that the size of the pool of people who could be included as a possible source of a specific hair is unknown."[8] It is therefore impossible to say that strands of hair came from a particular

[6] Spencer S. Hsu, *Kirk Odom, Who Served 20 Years for 1981 D.C. Rape, is Innocent, Prosecutors Say*, Wash. Post, July 10, 2012; Spencer S. Hsu, *Santae Tribble Cleared in 1978 Murder Based on DNA Hair Test*, Wash. Post, Dec. 14, 2012.

[7] Spencer Hsu, *FBI Admits Flaws in Hair Analysis Over Decades*, Wash. Post, Apr. 19, 2015.

[8] *See* Norman L. Reimer, *The Hair Microscopy Review Project*, The Champion, July 2013, at 16; Spencer S. Hsu, *Justice Dept., FBI to Review Use of Forensic Evidence in Thousands of Cases*, Wash. Post. July 10, 2012; Spencer S. Hsu, *U.S. Reviewing 27 Death Penalty Convictions for FBI Forensic Testimony Errors*, Wash. Post, July 17, 2013; Innocence Project, *Innocence Project and NACDL Announce Historic Partnership with the FBI and Department of Justice on Microscopic Hair Analysis Cases* (July 18, 2013), *available at* http://www.innocenceproject.org/news-events-exonerations/press-releases/innocence-project-and-nacdl-announce-historic-partnership-with-the-fbi-and-department-of-justice-on-microscopic-hair-analysis-cases.

person.[9] In fact, of the 340 convictions overturned by post-conviction DNA testing in this nation, at least 74 – about one in four – involved flawed microscopic hair analysis, where a hair from the crime scene was deemed to be "similar to" or "consistent with" the defendant's or the victim's hair standard.[10]

3. The requested STR DNA testing of the blood evidence and mtDNA testing of the hair evidence is reasonable in scope.

STR testing can generate a profile that is effectively unique; Since 1995, the capacities of DNA forensic science have radically improved; new forms of testing, like mitochondrial DNA have been discovered, and STR technologies now have several sub-categories of highly refined testing methods that are the appropriate forms of testing to be used on the types of evidence available for testing here. Further facts regarding recent developments in DNA analysis that were unavailable at Mr. Lee's trial and in earlier post-conviction proceedings can be established at a hearing on this petition, if necessary.

The proposed testing is reasonable in scope and necessary to fully prove Mr. Lee's actual innocence claim. Accordingly, the presumption against timeliness is rebutted. See A.C.A. § 16-112-202(10)(B)(iv); *Carter v. State*, 2015 Ark. 57, *7.

[9] Spencer S. Hsu, *Convicted defendants left uninformed of forensic flaws found by Justice Dept*., Wash. Post, Apr. 16, 2012 ("researchers [have long] acknowledged that visual [hair] comparisons are so subjective that different analysts can reach different conclusions about the same hair").

[10] *See Innocence Project and NACDL Announce Historic Partnership with the FBI and Department of Justice on Microscopic Hair Analysis Cases* (July 18, 2013).

D. The Petitioner's Identity Was at Issue During the Investigation and Prosecution of Debra Reese's Murder.

The identity of the perpetrator of Ms. Reese's murder has always been at issue as the Petitioner has maintained his actual innocence of the crime since the time of his arrest, has consistently pled not guilty, and has strenuously litigated his innocence claim. Indeed, at trial, Petitioner's counsel emphasized the limited probative value of the forensic testing done by the State, and argued that it was insufficient for the jury to find that the blood was the victim's and that the hairs belonged to the defendant. On appeal, he continued to argue that the blood evidence could have been exculpatory had the State preserved it in sufficient quantities for further testing (which is now possible due to advances in technology). Because Petitioner has never conceded these critical points – and, indeed, has challenged the State's evidence and maintained his innocence since trial – this provision of the statute is satisfied.

E. Petitioner Can Identify a Theory of Defense That is Not Inconsistent With His Defense at Trial and May be Able to Produce New Material Evidence Establishing His Actual Innocence.

In light of his two decades old innocence claim, Petitioner can readily identify a theory of defense consistent with the "not guilty" plea presented at trial that could establish his actual innocence. He consistently maintained at trial and since that time that he was not perpetrator of this crime, and the DNA testing requested would disprove critical State evidence tending to show that he was the perpetrator. With respect to the current testing, the potential materiality of exculpatory DNA results is apparent, because the testing can: (1) show that the blood on Petitioner's shoes was not Mr. Lee's; (2) show that the "Negroid" hairs found at the crime scene came from someone other than Mr. Lee, and (3) if an STR-DNA profile is obtained from the root of the "intact" hair (as the State's expert said was present when he examined the root), and Mr. Lee is not the source, that STR-DNA profile can be searched in the CODIS DNA database, and

potentially identify Ms. Lee's actual killer.[11]

There are also important public safety interests to be served by the testing Petitioner now seeks. If Mr. Lee is actually innocent of Ms. Reese's murder, then the real perpetrator of this brutal crime has not yet been brought to justice. That individual may still be at large, or incarcerated but pending release, and thus putting other members of the public at risk of future violence. The potential for post-conviction DNA testing to identify the real perpetrator of a serious crime is not speculative: in fully 29% of the post-conviction DNA exonerations documented over a twenty-five year period (1986-2014), the same DNA testing that exculpated a wrongly convicted defendant was used to directly identify a known alternate suspect in the crime(s). *See* West & Meterko, *DNA Exonerations 1989-2014: Review of Data and Findings from the First Twenty-Five Years,* 79 Alb. Law Rev. 717, 730-31 (2015-16). Tragically, many of these individuals had committed still more violent crimes while the innocent defendants were wrongly incarcerated: sixty-eight of these perpetrators went on to commit at least 142 additional violent crimes – including 34 homicides and 77 rapes. *See id.* at 731.

REQUEST FOR HEARING

Mr. Lee respectfully requests that the Court schedule a hearing so that the Court can carefully consider expert and other evidence supporting this Motion for DNA testing. Pursuant to A.C.A. § 16-112-205(a), a hearing is required "unless the petition and the files and records of the proceeding conclusively show that the petitioner is entitled to no relief." This is Mr. Lee's

[11] The FBI's CODIS database is a vast, computerized network of STR-DNA profiles from convicted offenders, arrestees, and crime scenes from around the country that can be immediately compared to unknown profiles in pending investigations. As of February 2017, the database contained over 12.7 million convicted offender profiles, and 2.6 million arrestee profiles – including more than 200,000 profiles for offenders and arrestees submitted by the State of Arkansas. *See* CODIS-NDIS Statistics, Federal Bureau of Investigation, *available at https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics* (last visited April 14, 2017).

first petition requesting relief because of the availability of new scientific testing and evidence. In *Carter v. State*, the Arkansas Supreme Court held that an evidentiary hearing is necessary where a person seeking post-conviction DNA testing alleges facts that entitle them to relief. *See Carter v. State*, 2015 Ark. 57 (2015). Just as in *Carter*, Mr. Lee has alleged facts which establish his right to relief. Accordingly, this Court should schedule a hearing at which Mr. Lee may present evidence to prove all of the facts alleged in this Motion.

CONCLUSION

For all the aforementioned reasons, Petitioner's request that forensic DNA testing be performed on the biological evidence on the Converse tennis shoes in this case—with all costs to be paid for by the Innocence Project—should be granted.

WHEREFORE, The Petitioner states the following requests for relief:

1. An Order granting a hearing at which Mr. Lee, through undersigned counsel, may fully present the evidence supporting this motion;

2. An Order releasing the already collected evidence to an accredited, private DNA laboratory;

3. An Order compelling the State of Arkansas to properly preserve any additionally discovered physical evidence until further order from this Court and, if such evidence were to be discovered, to allow for an amended testing order to include additional DNA testing of any probative evidence;

4. An Order compelling the State of Arkansas, the Jacksonville Police Department, and the Arkansas State Police to disclose and turn over all evidence accrued from any prior DNA testing or investigation in the Petitioner's case and all relevant documents, including and not limited to police reports, lab reports, photographs, trial exhibits, bench notes, *etc*. regarding the

Petitioner's case;

5. An Order staying Mr. Lee's execution before consideration of this Motion and completion of the requested DNA testing;

6. Any other Order that the Court deems necessary to adequately protect the Petitioner's state and federal constitutional rights.

Respectfully submitted,

/s/Lee D. Short
LEE D. SHORT
SHORT LAW FIRM
425 W. Broadway, Suite A
North Little Rock, AR 72114
LeeDShort@gmail.com
Bar # 2010-136
(501) 766-2207

CERTIFICATE OF SERVICE

I hereby certify that the foregoing document was electronically delivered to the following:

Larry Jegley
Prosecuting Attorney

Leslie Rutledge
Attorney General

/s/Lee D. Short
LEE D. SHORT

Declaration of Ledell Lee

1. My name is Ledell Lee.
2. I was convicted in 1995 of the capital murder of Debra Reese. I have always maintained my innocence in this case.
3. I had an alibi and the facts of the murder as alleged by the State against me were untrue.
4. The jury was hung at my first trial, and I was not convicted until the State's second attempt.
5. The State used forensic evidence against me in my second trial. They tested spots on the tongue and sole of my tennis shoes to determine the presence of blood, and the State expert testified that the spots were blood. The State argued to the jury that the blood was the victim's.
6. I sought testing to prove that the blood was not the victim's. This would have been powerful evidence of my innocence. At trial, the State's expert testified that he used all of the blood from the shoes in his confirmatory blood test and that there would not be enough remaining evidence for testing to determine whose blood it was.
7. Today, a modern DNA method, STR-DNA testing, is available to test the traces of the original stain. These tests will show that the blood did not belong to the victim and will exonerate me.
8. The scientific evidence from STR-DNA testing was not available at the time of trial and establishes my actual innocence.
9. An attorney talked with me, talked with DNA experts, and then wrote this statement. I agree with all of the facts.

I swear that the foregoing is true and correct to the best of my knowledge under penalty of perjury under the laws of the United States.

4-14-17
Date


Ledell Lee

AFFIDAVIT OF CHARLOTTE J. WORD, Ph.D.

Charlotte J. Word, being duly sworn according to law, upon her oath deposes and says:

1. I, Charlotte Word, am a consultant in forensic DNA testing. I am a former Laboratory Director at Cellmark Diagnostics (which became Orchid Cellmark) in Germantown, MD. I was employed at Cellmark from April 1990 to April 2005.
2. Cellmark Diagnostics in Germantown, MD was a private laboratory that conducted human DNA identification testing and was accredited in 1994 by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board. For many years the Laboratory was also accredited by the American Association of Blood Banks for parentage testing. As a private laboratory in business for over 17 years, Cellmark offered DNA testing services to a wide variety of clients including but not limited to, crime laboratories, prosecutors, defense attorneys, law enforcement, the military, and state and local agencies from around the country.
3. I received a Bachelor of Science degree in Biology from The College of William and Mary in Virginia, and a Ph.D. in Microbiology from The University of Virginia. I did a postdoctoral fellowship at the University of Texas Southwestern Medical School in Dallas, TX conducting research in the areas of molecular biology and immunology. I was on the faculty at the University of New Mexico, School of Medicine, where I did research and taught in the areas of molecular biology and immunology from 1984 to 1990. I have over 37 years of molecular biology experience and over 27 years of experience applying molecular genetics techniques to forensic testing including experience with the majority of the scientific tests used in the United States since 1990 for forensic human DNA identification testing. This includes the extensive use of restriction fragment length polymorphism (RFLP) and polymerase chain reaction (PCR) testing. I have experience in the application of the various, and now outdated, test

procedures used in forensic casework including DQα/DQA1, PM (also referred to as "Polymarker"), D1S80 and short tandem repeat (STR) testing using the "CTT" and "CTT-A" GenePrint systems from Promega Corporation, as well as with the various test systems using fluorescently-labeled STRs, commonly used since the late 1990's.

4. In 1998 and 1999 I was a member of the Post-Conviction Issues Working Group of Attorney General Janet Reno's National Commission on the Future of DNA Evidence and co-author of "Postconviction DNA Testing: Recommendations for Handling Requests" 1999, U.S. Department of Justice Office of Justice Programs. I am on the Editorial Board of the Journal of Forensic Sciences, which is the premiere forensic journal in the United States, where I serve as a peer reviewer and advisor to the editor. I am also a guest reviewer for the journal *Forensic Science International: Genetics*. I am currently a member of the Biological Data Interpretation and Reporting Subcommittee of the Biology/DNA Scientific Area Committee of the Organization of Scientific Area Committees (OSAC) and a member of the DNA Consensus Board of the American Academy of Forensic Sciences (AAFS) Academy Standards Board. I was a member of the Reporting and Testimony Subcommittee of the National Commission on Forensic Science that just ended this week.
5. My curriculum vitae is attached as Exhibit A.
6. I have been requested by counsel for Ledell Lee to provide my opinions regarding the possibility of performing DNA testing on evidence in the case of *State of Arkansas v. Ledell Lee*. It is my understanding, based on information received from counsel and my review of the 1995 trial testimony of Kermit Channell, a forensic serologist with the Arkansas State Crime Laboratory, that a pair of Converse tennis shoes worn by Mr. Lee when he was arrested in 1993 was tested by Mr. Channell at the State Crime Laboratory, and that human blood was identified from two spots observed on the shoes.

The testimony from the trial indicates that the entire sample from at least one of the shoes was consumed so additional tests could not be performed.[1]

7. At the time of Mr. Lee's arrest in 1993, two forms of DNA testing were available in the United States, and had been available since the late 1980s. Restriction fragment length polymorphism ("RFLP") testing required a large biological sample (e.g., dime to quarter-sized blood stain) to generate interpretable results, and likely would not have been a reasonable test to perform in this case due to the sample-size requirements. Polymerase chain reaction ("PCR") testing using the DQα AmpliType Amplification and Typing Kit was being used in a number of laboratories in the United States, including the FBI laboratory and several private laboratories. This test required a much smaller sample than RFLP testing. However, since it only provided DNA test results at one locus, the data were often not very discriminating. Based on Mr. Channell's testimony at trial, it is unlikely that useful test results would have been obtained from the two shoes in 1993-95 due to the very small sample size.
8. Since 1993, there have been significant improvements in forensic analysis of biological samples beyond what was available for blood typing and early DNA testing; this is especially true with the major advances in DNA testing capabilities. Three of the key advances in the field provide substantially more and more useful DNA data than what may have been obtained in the early 1990s. First, the current DNA tests permit the analysis of very small quantities of biological material, including human blood, allowing for the testing of far smaller amounts of material than could be performed using conventional serology (blood grouping) analysis. Second, these tests have exponentially greater "discrimination" power – the ability to distinguish among individuals in the population, and determine whether or not a specific individual can or cannot be the

[1] The trial transcript of Mr. Channell indicates that each of the two stains tested were from the tongue of the right shoe and left shoe. It is my understanding from counsel that the 1997 appellate decision indicates that the spot tested on the left shoe was from the sole of the shoe.

donor of the material. With today's tests, it is possible to obtain statistical frequencies for a match between a DNA profile from a blood stain and a known individual that far exceed the population of the world, leaving little doubt as to the source of the biological sample. Conversely, today's DNA tests can determine that an individual is absolutely not the source of the material tested (i.e., exclude the individual as the source). Third, is the introduction of mitochondrial DNA (mtDNA) testing using DNA sequencing technologies in a few laboratories in the United States, including at the FBI laboratory. This test, which was not available at the time of Mr. Lee's trial, is most commonly used on hair shafts and on biological samples that have been environmentally-stressed such that the DNA is so highly degraded (i.e., broken down into very small pieces) that it is unable to generate test results with conventional DNA tests.

9. Today in the United States, the PCR-based DNA test kits routinely used in all forensic laboratories test for at least 20 STR (Short Tandem Repeat) loci in addition to other markers that confirm the gender of the donor of the DNA in the biological sample. These tests require very small samples, and have been shown to generate interpretable profiles from 20 cells or less, especially if the DNA is from a single contributor. These new test kits, which have only been available in forensic laboratories over the past few months to a year, are also resistant to inhibition by factors inherent in some samples allowing for testing of samples that may not have generated DNA test results with the earlier PCR-based STR tests. In addition, these new kits were developed specifically to generate results from older samples that may have undergone some limited degradation of the DNA over time.
10. If there is any small amount of the original blood stains on the shoes or on the swab (or other material) used during the test for blood in the crime laboratory, it is very possible that DNA test results can be generated using today's technology with kits having significantly improved sensitivity. It is also possible that additional small stains that were

not noted previously, and which may be suitable for testing, could be identified on the shoes upon re-examination. For example, minute deposits of blood may remain on the shoe which were not noted or tested by Mr. Channell -- perhaps because such quantities were insufficient for serology testing and thus not deemed significant at that time -- but which could yield the blood donor's DNA profile using today's methods. It is not uncommon for additional biological stains to be discovered upon re-examination of evidence samples years later and to produce significant scientific data. Any DNA test results obtained from a stain on the shoes may be compared to the DNA profile from Mr. Lee and from Ms. Debra Reese to determine if either are included or excluded as the source of the DNA.

11. Similarly, any other biological evidence deposited by an individual or transferred to the victim from the perpetrator, and vice versa, present on other items recovered from the crime scene, victim or the defendant may also be suited for testing with today's various STR DNA typing and/or mtDNA sequencing technologies. For example, a mtDNA sequence can often be generated from the shaft of a hair that is approximately an inch in length or longer and can exclude an individual as the source of the hair. Alternatively, if there is a root on the hair, conventional PCR STR DNA testing procedures may be used to generate a profile suitable for comparison to DNA profiles obtained from Ms. Reese and Mr. Lee and for entry into the FBI's CODIS database.

I swear, under penalty of perjury, that the foregoing is true and correct to the best of my knowledge, under the laws of the United States.

Dated: April 14, 2017

Charlotte J. Word, Ph.D.

SUBSCRIBED AND SWORN to before me this 14th day of April, 2017.

Sworn and subscribed before me, in my presence
This 14 day of APRIL 17, a Virginia Notary
Public, In and for Chesterfield County.

M. Olszewski
Notary Public
My Commission Expires 05/31/2020

MELISSA ANNA OLSZEWSKI
NOTARY PUBLIC
REG # 7704825
MY COMMISSION EXPIRES
5/31/2020
COMMONWEALTH OF VIRGINIA

Exhibit A

Curriculum Vitae

Charlotte J. Word, Ph.D.

Education

Ph.D. Microbiology, University of Virginia, Charlottesville, Virginia, 1981

B.S. Biology, College of William and Mary, Williamsburg, Virginia, 1976

Professional Experience

Consultant, Human DNA Identification and Paternity Testing, 2005 - present

Consultant, Boston University School of Medicine, NIJ Training Grant awarded to Dr. Robin Cotton, 2008 – 2015.

Consultant, Orchid Cellmark, Germantown, MD; Dallas, TX, 2005 - 2012

Consultant, Applied Biosystems, Inc. 2006 - 2012

Project Staff Associate, Northeast Regional Forensic Institute, Research Foundation of State University of New York, Albany, New York, 2006 - 2007

Senior Manager, Forensics and Laboratory Director, Orchid Cellmark, Germantown, Maryland, 2001 - 2005

Deputy Laboratory Director, Forensic Laboratory, Cellmark Diagnostics, Inc., Germantown, Maryland, 1997 - 2001

Senior Scientist, Cellmark Diagnostics, Inc., Germantown, Maryland, 1995 - 1997

Scientist, Cellmark Diagnostics, Inc., Germantown, Maryland, 1990 - 1995

Research Assistant Professor, Department of Cell Biology, University of New Mexico School of Medicine, Albuquerque, New Mexico, 1984 -1990

Research Fellow, Dr. Philip W. Tucker, Department of Microbiology
University of Texas Southwestern Medical School, Dallas, Texas, 1981 - 1984

Graduate Research Student (Ph.D.), Dr. W. Michael Kuehl, Department of Microbiology,

University of Virginia. Thesis Title: "Murine B Lymphomas: Models for Immunoglobulin Expression in B Cell Development.", 1976 - 1981

Sabbatical with Dr. Randolph Wall, University of California at Los Angeles Molecular Biology Institute, Los Angeles, California, 1980

Participant, Histopathobiology of Cancer Workshop, Keystone, Colorado, 1979

Professional Associations and Licensures

American Society of Human Genetics

American Academy of Forensic Sciences

Mid-Atlantic Association of Forensic Scientists

Mid-Atlantic Cold Case Homicide Investigators Association (MACCHIA)

CE Users Group

Maryland Department of Health and Mental Hygiene, Office of Health Care Quality, Forensic Letter of Permit Exception

Honors and Research Support

Member, Subcommittee on Biology/DNA Analysis 2 (Biology Data Interpretation and Reporting) of the Biology/DNA Scientific Area Committee of the Organization of Scientific Area Committees (OSAC), 2014–present

Member, American Academy of Forensic Sciences, Academy Standards Board, DNA Consensus Board, 2016-present

Member, Reporting and Testimony Subcommittee of the National Commission on Forensic Science, 2014–2017

District of Columbia Department of Forensic Sciences Science Advisory Board, 2014–2015

Grant Review for National Institutes of Justice, 2006–present

Auditor for the National Forensic Science Technology Center, 2005–2011

Inspector for the American Society of Laboratory Directors/Laboratory Accreditation Board 2004 – 2005, 2010.

Editorial Board, *The Journal of Forensic Sciences*, 2004 – present

Guest Reviewer, *The Journal of Forensic Sciences*, 2002 – 2004

Guest Reviewer, *Forensic Science International:Genetics*, 2012-present

Member, Post-Conviction Issues Working Group of the National Commission on the Future of DNA Evidence, 1998-1999. Co-author of "Postconviction DNA Testing: Recommendations for Handling Requests" 1999, U.S. Department of Justice Office of Justice Programs.

United States Department of Defense, 1996-1998, Enhanced DNA Recovery, $318,000.

NIH 1 RO1 HD20409. Immunoregulatory Factors in Human Colostrum. $88,218 (direct). 07/01/87 – 06/30/90. Co-PI: S. Crago.

American Heart Association Grant-In-Aid 1985-1989, Regulation of B Cell Immunoglobulin Isotype by T Cells, $99,000.

American Cancer Society Junior Faculty Research Award 1985-1988, Regulation of B Cell Immunoglobulin Isotype by T Cells, $90,500.

Recipient of AAI travel award for 6th International Congress of Immunology, 1986.

Fellow, Damon Runyon –Walter Winchell Cancer Fund Award, 1982-1984.

Semi-Finalist, 1981 Distinguished Dissertation Award from the Council of Graduate Schools/University Microfilms International.

Publications

Word, C.J. and Kuehl, W.M. 1981. Expression of surface and secreted IgG_{2a} by a murine B lymphoma before and after hybridization to myeloma cells. Mol. Immunol. 18:311-322.

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cell differentiation factor(s) for IgG (BCDFγ) on γ-specific mRNA in murine B cells. J. Immunol. 131:3049-3051.

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Word, C.J., Mushinski, J.F., and Tucker, P.W. 1983. The murine immunoglobulin α gene expresses multiple transcripts from a unique membrane exon. 5th International Congress of Immunology.

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Cotton, R.W., Wadhams, M.J., Kriss, J., Sipes, D., Forman, L. and Word, C.J. 1994. Validation of two STR loci in preparation for casework implementation. Fifth International Symposium on Human Identification, Scottsdale, AZ.

Kriss, J., Forman, L., Cotton, R.W., and Word, C.J. 1995. Validation studies using the AmpliType® PM PCR Amplification and Typing Kit. 47th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Cotton, R.W., Kriss, J., Sipes, D.E., Wadhams, M., Forman, L., and Word, C.J. 1995. Experimental validation of three STR loci for forensic casework. 47th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Bing, D.H., and Word, C.J., et al. 1995. PCR based forensic testing with AmpliType® PM PCR Amplification and Typing Kit: The results of validation studies from forensic laboratories. 47th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Word, C.J., Presenter. 1995. AmpliType Users Forum. 47th Ann. Mtg. Seattle, WA.

Word, C.J. 1995. Implementation of STR/$AgNO_3$ protocols on casework. Florida DNA Training Session III: Advanced PCR Applications. Altamonte Springs, FL.

Word, C.J., Cotton, R.W., Ranadive, A.A., and Weber, M.A. 1995. Forensic casework analysis using STRs, DQα and PM in combination. Sixth International Symposium on Human Identification, Scottsdale, AZ.

Word, C.J. 1995. DNA Mid-Atlantic Association of Forensic Scientists Presents "The Gilbert and Trias Murders." Gaithersburg, MD.

Cotton, R.W., Chakraborty, R., Crouse, C., Forman, L., Kriss, J., Ranadive, A. A., Sipes, D.E., Weber, M.A., Weir, B., Word, C.J. 1996. Analysis of casework samples using a combination of the DQα, PM, and 3 STR loci. 48th Annual Meeting of the American Academy of Forensic Sciences, Nashville, TN.

Word, C.J. 1996. DNA Interpretation Issues Workshop. Northwest Association of Forensic Sciences Meeting, Salt Lake City, UT.

Word, C.J. 1996. Interpretation of mixed samples. Human Identification Users Meeting. Rockville, MD.

Word, C.J. 1997. STR data goes to court - A laboratory perspective. Eighth International Symposium on Human Identification, Scottsdale, AZ.

Word, C.J. and Gregory, S.A. 1997. Optimization of recovery and PCR amplification of DNA from stamps and envelopes. Eighth International Meeting on Human Identification, Scottsdale, AZ.

Reynolds, J.E., Weber, M.A., Colombo, K., Swienton, A.R., Word, C.J., Yates, P.J., Cotton, R.W. 1997. DNA typing of the transfused individual. Am. J. Hum. Genet. 61(4):A1311; Poster presentation at the 47th Annual Meeting of the American Society of Human Genetics, Baltimore, MD.

Reynolds, J.E., Weber, M.A., Colombo, K.A., Swienton, A.R., Word, C.J., Yates, P.J., and Cotton, R.W. 1998. The effects of blood transfusion on RFLP and PCR DNA

typing: Forensic casework examples. 50th Annual Meeting of the American Academy of Forensic Sciences, San Francisco, CA.

Word, C.J., Gregory, S.A., Reynolds, J.E., and Cotton, R.W., 1998. PCR amplification and overcoming inhibition of DNA recovered from adhesive surfaces. 50th Annual Meeting of the American Academy of Forensic Sciences, San Francisco, CA.

Word, C. J. 1998. DNA quantitation and PCR inhibition issues. Florida DNA Training Session IV: STRs - The Next Generation, Orlando, FL.

Grossweiler, L.L., Gee, M.A., Crance, K.A., Sipes, D.E., Word, C.J., and Reynolds, J.E. 2000. Successful DNA extraction from serum samples. 11th International Symposium on Human Identification, Biloxi, MS.

Maddox, L.O., Suit, B., Koch, K., Higgins, J., Word, C.J., and Cotton, R.W. 2000. Forensic use of Abacus OneStep ABAcard® test for the identification of the p30 antigen. 11th International Symposium on Human Identification, Biloxi, MS.

Word, C.J., Danielsen, L.A., Reynolds, J.E., Maddox, L.O., and Cotton, R.W. 2000. Multiple-laboratory validation of fluorescent STRs using proficiency test results. 11th International Symposium on Human Identification, Biloxi, MS.

Word, C.J., Reynolds, J.E., Cotton, R.W., Grossweiler, L.L., Maddox, L.O. 2001. Solving old crimes with new DNA testing - contracting "cold" cases. 53rd Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA. (presented by Melissa B. Thompson)

Cotton, R.W., Word, C.J., Danielsen, L.A., Reynolds, J.E., and Maddox, L.O. 2001. Demonstration of general acceptance of STR data to the court. 53rd Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Cotton, R.W., Kriss, J.E., Colombo, K.A., Word, C.J., and Maddox, L.O. 2001. Defining alleles for four Y chromosomal markers without benefit of allelic ladders as part of Y chromosome validation studies. 53rd Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Maddox, L.O., Suit, B., Word, C.J., Cotton, R.W. 2001. Advantages of enhanced sensitivity of product gel staining using GelStar™ nucleic acid stain. 53rd Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Gee, M.A., Grossweiler, L.L., Crance, K.A., Sipes, D.E., Word, C.J., and Reynolds, J.E. 2001. Recovery of DNA from serum samples. 53rd Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA.

Word, C.J. 2001. Panelist at Brooklyn Law School Symposium, DNA: Lessons from the Past, Problems for the Future, Brooklyn, NY.

Grgicak, C.M., Reynolds, J.E., Sipes, D.E., Rosier, L.R., Knickerbocker, C.J., Zimmerman, C.E., Shofkom, A.E., Befus, J.K., Cotton, R.W., Word, C.J. 2002. Relative sensitivity comparison between ABI fluorescent detection instruments using data from large scale no-suspect casework. 54th Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA.

Cline, R., Polhamus, C., Winebrenner, L., Leisy, C., Heller, A., Cicco, M., Grossweiler, L., Kokoszka, J. E., and Word, C. J. 2002. The night the lights went out in Germantown, An amplification study. 13th International Symposium on Human Identification, Phoenix, AZ.

Grgicak, C., Sipes, D.E., Grossweiler, L.L., Cotton, R.W., Word, C.J. 2003. Comparative Analysis of the DNA IQ™ and QIAamp DNA® Extraction Kits for the Processing of Forensic Evidentiary Samples. 55th Annual Meeting of the American Academy of Forensic Sciences, Chicago, IL.

Grossweiler, L.L., Word, C.J., Maddox, L.O., 2003. Decision Branches for Testing of No Suspect Casework. 55th Annual Meeting of the American Academy of Forensic Sciences, Chicago, IL.

Word, C.J. Co-presenter 2005. Presenting DNA Evidence in Court. Sixteenth International Symposium on Human Identification, Dallas, TX

Word, C.J. 2006. Presented Workshop: Statistics in the Courtroom. 5th Annual Bode East Coast Advanced DNA Technology Workshop, Captiva Island, FL

Word, C.J. and Clarke, G. W. 2006. Presented Workshop: Courtroom Testimony: What You Need to Know. 17th Annual International Symposium on Human Identification, Nashville, TN

Word, C.J. and Dale, W. M. 2006. Quality Management System Concept and Tools "Mistakes Happen-What to do when it Happens to you & How to Prevent Them". 17th Annual International Symposium on Human Identification, Nashville, TN

Word, C.J. and Clarke, G. W. 2007. Presented Workshop: Expert Witness Testimony. 18th Annual International Symposium on Human Identification, Hollywood, CA.

Word, C.J. 2009. Presented Workshop: Expert Witness Testimony for New and Advanced DNA Analysts. Albany, NY

Word, C.J. 2009. What is LCN? Definitions and Challenges. 20th International Symposium on Human Identification, Las Vegas, NV

Word, C.J., Cotton, R.W., Grgicak, C., Butler, J. and Coble, M. 2010. Mixture Interpretation: Principles, Protocols, Practice Workshop at 21st International Symposium on Human Identification, San Antonio, TX

Word, C.J. 2011. DNA Testing – Can Anyone be Excluded? Bode West meeting, San Diego, CA

Word, C.J. 2011. Achieving Neutrality as an Expert, Bode West meeting, San Diego, CA

Word, C.J., Cotton, R.W., Grgicak, C.M., Coble, M.D., and Butler, J.M. 2011. Mixture Interpretation: Principles, Protocols, Practice Workshops in Florida, Texas, Michigan and Arizona

Word, C.J. 2011. Mixture Interpretation. Green Mountain DNA Conference, Burlington, VT

Word, C.J., Cotton, R.W., Grgicak, C.M., Coble, M.D., and Butler, J.M. 2011. Mixture Interpretation: Using Scientific Analysis Workshop at 22nd International Symposium on Human Identification, National Harbor, MD

Cotton, R.W., Butler, J.M., Coble, M. D., Grgicak, C.M., Word, C.J., and Gunn, L.M. 2011. SWGDAM Mixture Interpretation Guidelines: Successes, Issues and Suggested Future Directions. Poster presented at 22nd International Symposium on Human Identification, National Harbor, MD

Cotton, R.W., Butler, J.M., Coble, M. D., and Word, C.J. 2012. DNA Mixture Interpretation Workshop. The NIJ Conference 2012, Arlington, VA

Word, C.J. 2012. "New and Improved" Technology – Where Have We Come and Where Do We Need to Go? Green Mountain DNA Conference, Burlington, VT

Word, C.J., Butler, J.M., Coble, M. D., Grgicak, C.M. and Cotton, R.W. 2012. 2012 Mixture Interpretation Workshop: Mixtures Using Sound Statistics, Interpretation and Conclusions. 23rd International Symposium on Human Identification, Nashville, TN

Word, C.J. Challenges and Impact of DNA Interpretation for Forensic Analysis. 2013. 29th International Symposium on MicroScale Bioseparations, University of Virginia, Charlottesville, VA

Word, C.J. Current Issues of DNA Testing. 2013. NACDL & CACJ's 6th Annual Forensic Science & the Law Conference "Making Sense of Science VI", Las Vegas, NV

Word, C.J. Different Assumptions & Different Conclusions. 2013. NIST DNA Mixture Interpretation Workshop & Webcast, with Butler, J.M., Coble, M.D., Cotton, R.W., Heidebrecht, B., Gaithersburg, MD

Word, C.J. Complex Mixtures. 2013. NIST DNA Mixture Interpretation Workshop & Webcast, with Butler, J.M., Coble, M.D., Cotton, R.W., Heidebrecht, B., Gaithersburg, MD

Word, C.J., Cotton, R., Butler, J., Coble, M. and Grgicak, C. 2013. A Clarion Call to Improve the Underlying Science, Laboratory Efficiency and Cost Associated with Testing of Complex DNA Mixtures and Interpretation. ASCLD 40th Anniversary Meeting, Durham, NC

Word, C.J. 2013. Complex Mixture Interpretation Issues. 2nd Annual Advanced DNA Technology Workshop – Bode Mid-Atlantic , Charlottesville, VA

Word, C.J., Buzzell, L.H. III, Scoville, S.G., Spurgeon, T. 2013. Expert Witness Testimony Workshop. 24th International Symposium on Human Identification. Atlanta, GA

Word, C.J. 2013. Complex Mixture Fundamentals. DNA Technical Leader Summit. Norman, OK

Word, C.J. 2013. Recent Issues Seen in Court. DNA Technical Leader Summit. Norman, OK

Word, C.J. 2013. Court Admissibility Considerations. DNA Technical Leader Summit. Norman, OK

Butler, J.M., Word, C.J., Coble, M. 2014. DNA Mixture Interpretation: History, Challenges, Statistical Approaches, and Solutions. 66th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA

Word, C.J. 2014. Science of the Current Generation. MAAFS 2014 Winter Workshop: TARDIS of Molecular Biology, Manassas, VA

Word, C.J. 2014. New Aspects of Testimony. MAAFS 2014 Winter Workshop: TARDIS of Molecular Biology, Manassas, VA

Word, C.J. 2014. Scientific Neutrality in Expert Witness Testimony. Plenary Session co-presented with Lewis Buzzell III, J.D. and Scott Scoville, J.D. MAAFS 2014 Annual Meeting, State College, PA

Word, C.J. 2014. Why Do We Need to Consider Probabilistic Modeling? NIST DNA Analyst Webinar Series: Probabilistic Genotyping and Software Programs (Part 1)

Word, C.J. 2014. Why Do We Need Probabilistic Modeling? Green Mountain DNA Conference, Burlington, VT

Word, C.J. 2014. Why Do We Need Probabilistic Software? and Reporting Likelihood Ratios & Court, Almost Everything You Wanted to Know About Probabilistic Software Workshop, Co-Chair of Workshop, International Symposium on Human Identification, Phoenix, AZ

Word, C.J. 2014. Complex DNA Mixtures: Issues in Interpretation, The Center for Forensic Science Research & Education, Advanced Topics for Human Identification & Data Interpretation, Philadelphia, PA

Word, C.J. 2015. Scientific Neutrality in Expert Witness Testimony Workshop. "Role and Responsibilities of the Forensic Science Expert Witness" and "Preparing for Court Testimony." Co-presented with Lewis Buzzell III, J.D., Christopher Plourd, J.D., Ronald Reinstein, J.D. and Tammy Spurgeon, J.D. American Academy of Forensic Sciences 2015 Annual Meeting, Orlando, FL

Word, C.J. 2015. Errors in DNA Testing: Lessons Learned – A Retrospective Look. American Academy of Forensic Sciences 2015 Annual Meeting, Orlando, FL

Word, C.J. 2015. An Application of the Kipling Method to DNA Validation in the 21st Century Workshop. "Introduction to Validation" and "From Validation to SOP." Co-presented with Michael Coble, Ph.D. and Robin W. Cotton, Ph.D., American Society of Crime Laboratory Directors (ASCLD) 42nd Annual Meeting: Excellence in Forensic Leadership – Policy and Practice in the 21st Century, Washington, DC

Word, C.J. 2015. Errors in Interpretation of DNA Profile Data. International Symposium on Forensic Science Error Management – Detection, Measurement and Mitigation, Crystal City, VA

Word, C.J. 2015. Errors in a DNA Testing Laboratory. International Symposium on Forensic Science Error Management – Detection, Measurement and Mitigation, Crystal City, VA

Word, C.J. 2015. What Does This Statement Really Mean? (poster) 26th Congress of the International Society for Forensic Genetics. Krakow, Poland

Word, C.J. 2015. Scientific Perspective of Current Admissibility Challenges. In "Why are We Having DNA Admissibility Hearings?" panel discussion. 26th International Symposium on Human Identification, Dallas, TX

Word, C.J. 2016. Limitations of Current DNA Testing: Information That May Not Be in Reports. American Academy of Forensic Sciences 2016 Annual Meeting, Las Vegas, NV

Word, C.J. 2016. What Errors Are We Looking For and How Can We Look For More? American Academy of Forensic Sciences 2016 Annual Meeting, Las Vegas, NV

Word, C.J. 2016. Changes in Guidelines Governing Mixture Interpretation:

New SWGDAM Guidelines, Population Database Problems & Implication for Post-Conviction Cases, NACDL In the Mix? Dealing With DNA, Cognitive Bias & Habeas in the Innocence Case, San Antonia, TX

Word, C.J. 2016. Final Reports: Do They Say What We *Really* Mean? Mid-Atlantic Association of Forensic Scientists Annual Meeting, Richmond, VA

Word, C.J. 2016. Probabilistic Genotyping: Issues and Research Needs. Gordon Research Conference: Forensic Analysis of Human DNA, Waterville Valley, NH

Word, C.J. and Coble, M.D. (co-chair) 2016. Validation and Mixture Interpretation SOPs Workshop. 27th International Symposium on Human Identification, Minneapolis, MN

Word, C.J. and Cotton, R.W. (co-chair) 2016. Errors in Forensic Testing: Detection, Management & Resolution Workshop. 27th International Symposium on Human Identification, Minneapolis, MN

Seminars/Workshops Attended

69th Annual Meeting of the American Academy of Forensic Sciences, New Orleans, LA, 2017

27th International Symposium on Human Identification, Minneapolis, MN, 2016

HITA Workshop – Determining Phenotypes from Genotypes. 27th International Symposium on Human Identification, Minneapolis, MN, 2016

Gordon Research Conference: Forensic Analysis of Human DNA, Waterville Valley, NH, 2016

Mid-Atlantic Association of Forensic Scientists Annual Meeting, Richmond, VA 2016

Technical Colloquium Quantifying the Weight of Forensic Evidence, NIST, Gaithersburg, MD, 2016

In the Mix? Dealing With DNA, Cognitive Bias & Habeas in the Innocence Case, NACDL, San Antonio, TX, 2016

68th Annual Meeting of the American Academy of Forensic Sciences, Las Vegas, NV, 2016

26th International Symposium on Human Identification, Dallas, TX, 2015

HITA Workshop – Addressing Social Issues with Human Identification: An Interactive Workshop. 26th International Symposium on Human Identification, Dallas, TX, 2015

Forensic Mixtures: Assessment, Analysis and Technology: Current Methods, New Approaches and Disruptive Technologies Workshop. 26th International Symposium on Human Identification, Dallas, TX, 2015

Countdown to 2017: Internal Validation of the New CODIS Loci Workshop. 26th International Symposium on Human Identification, Dallas, TX, 2015

26th Congress of the International Society for Forensic Genetics. Krakow, Poland, 2015

Beyond DNA-Profiling: RNA-Profiling, Transfer and Persistence – What is it and How did it Get There? Workshop. 26th Congress of the International Society for Forensic Genetics. Krakow, Poland, 2015

The New Y Chromosome Haplotype Reference Database and Optimized Approaches for the Forensic Y-STR Analysis, Workshop. 26th Congress of the International Society for Forensic Genetics. Krakow, Poland, 2015

Ethical, Legal and Social Issues in Forensic Genetics, Workshop. 26th Congress of the International Society for Forensic Genetics. Krakow, Poland, 2015

International Symposium on Forensic Science Error Management – Detection, Measurement and Mitigation, Crystal City, VA, 2015

American Society of Crime Laboratory Directors (ASCLD) 42nd Annual Meeting: Excellence in Forensic Leadership – Policy and Practice in the 21st Century, Washington, DC, 2015

67th Annual Meeting of the American Academy of Forensic Sciences, Orlando, FL, 2015

Advanced Topics for Human Identification & Data Interpretation, The Center for Forensic Science Res2015earch & Education, Philadelphia, PA, 2014

25th International Symposium on Human Identification, Phoenix, AZ, 2014

New Autosomal and Y-STR Loci and Kits, International Symposium on Human Identification, Phoenix, AZ, 2014

Interpretation of Complex DNA Mixtures: The Biological and Statistical Perspectives, International Symposium on Human Identification, Phoenix, AZ, 2014

Almost Everything You Wanted to Know About Probabilistic Software, International Symposium on Human Identification, Phoenix, AZ, 2014

Emerging Forensic Genomic Applications, Greenville, NC, 2014

Green Mountain DNA Conference, Burlington, VT, 2014

NIST DNA Analyst Webinar Series: Probabilistic Genotyping and Software Programs (Part 1), Gaithersburg, MD 2014

Mid-Atlantic Association of Forensic Scientists Annual Meeting, State College, PA 2014

NFI Symposium: Interpretation of complex DNA profiles, The Hague, Netherlands, 2014

MAAFS 2014 Winter Workshop: TARDIS of Molecular Biology, Manassas, VA, 2014

DNA Technical Leader Summit, Norman, OK, 2013

2nd Annual Advanced DNA Technology Workshop – Bode Mid-Atlantic , Charlottesville, VA, 2013

24th International Symposium on Human Identification, Atlanta, GA, 2013

23rd Congress of the International Society for Forensic Genetics 2013, Melbourne, Australia, 2013

Advanced Principles in Forensic DNA Evidence Interpretation, International Society for Forensic Genetics 2013, Melbourne, Australia, 2013

Writing and Reviewing Scientific Papers Workshop, International Society for Forensic Genetics 2013, Melbourne, Australia, 2013

American Society of Crime Laboratory Directors (ASCLD) 40th Annual Meeting: The Business Behind the Science, Durham, NC, 2013

NIST DNA Mixture Interpretation Workshop & Webcast, Gaithersburg, MD, 2013

NACDL & CACJ's 6th Annual Forensic Science & the Law Conference "Making Sense of Science VI", Las Vegas, NV, 2013

29th International Symposium on MicroScale Bioseparations, University of Virginia, Charlottesville, VA, 2013

65th Annual Meeting of the American Academy of Forensic Sciences, Washington, D.C. 2013

23rd International Symposium on Human Identification, Nashville, TN, 2012

Green Mountain DNA Conference, Burlington, VT, 2012

The NIJ Conference 2012, Turning to Science: Enhancing Justice, Improving Science, Reducing Costs, Arlington, VA 2012

22nd International Symposium on Human Identification, National Harbor, MD, 2011

Green Mountain DNA Conference, Burlington, VT, 2011

The NIJ Conference 2011, Translational Criminology: Shaping Policy and Practice with Research, Crystal City, VA, 2011

Bode West meeting, San Diego, CA, 2011

63rd Annual Meeting of the American Academy of Forensic Sciences, Chicago, IL, 2011

NIJ/OLES-funded Research Symposium, Office of Law Enforcement Standards, National Institutes of Standards and Technology, Gaithersburg, MD, 2010

American Society of Human Genetics, 60th Annual meeting, Washington, D.C. 2010

21st International Symposium on Human Identification, San Antonio, TX, 2010

American Society of Crime Laboratory Directors Meeting, Baltimore, MD, 2010

15th National CODIS Conference, Reston, VA, 2009

20th International Symposium on Human Identification, Las Vegas, NV, 2009

Ethics Workshop, 20th International Symposium on Human Identification, Las Vegas, NV, 2009

The NIJ Conference 2009, Crystal City, VA, 2009

14th National CODIS Conference, Crystal City, VA, 2008

19th International Symposium on Human Identification, Hollywood, CA, 2008
Ethics and Forensic Science Workshop, 19th International Symposium on Human Identification, Hollywood, CA, 2008

Troubleshooting Common Laboratory Problems Workshop, 19th International Symposium on Human Identification, Hollywood, CA, 2008

The NIJ Conference 2008; Criminal Justice Research, Development and Evaluation in the Social and Physical Sciences, Crystal City, VA, 2008

60th Annual Meeting of the American Academy of Forensic Sciences, Washington, D.C. 2008

Human DNA Quantification Using Real Time PCR Assays Workshop, 60th Annual Meeting of the American Academy of Forensic Sciences, Washington, D.C. 2008

DNA Mixture Interpretation: Principals and Practice in Component Deconvolution and Statistical Analysis Workshop, 60th Annual Meeting of the American Academy of Forensic Sciences, Washington, D.C. 2008

Eighteenth International Symposium on Human Identification, Hollywood, CA, 2007.

The NIJ Conference 2007; Forensic DNA: Tools, Technology, and Policy, Arlington, VA, 2007

Grant Progress Assessment Training, Washington, D.C. 2007

HID 3130 Systems Training Program, Applied Biosystems, Rockville, MD, 2007

Twelfth National CODIS Conference, Arlington, VA, 2006

Seventeenth Annual International Symposium on Human Identification, Nashville, TN, 2006

5th Annual Bode East Coast Advanced DNA Technology Workshop, Captiva Island, FL, 2006

58th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA, 2006

Eleventh National CODIS Conference, Crystal City, VA, 2005

Sixteenth International Symposium on Human Identification, Dallas, TX, 2005

DNA Auditors Training Class, Quantico, VA, 2004

Tenth National CODIS Conference, Crystal City, VA, 2004

56th Annual Meeting of the American Academy of Forensic Sciences, Dallas, TX, 2004

American Prosecutors Research Institute National Conference: Justice Speaks, Crystal City, VA, 2003

Ninth National CODIS Conference, Lansdowne, VA, 2003

ASCLD/LAB Inspector's Training Class, Harrisburg, PA, 2003

Population Genetics Workshop, Taught by Dr. George Carmody, Rockville, MD, 2003

54th Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA, 2002

Y Chromosome Analysis and its Application to Forensic Casework Workshop, 54th Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA, 2002

Forensic Mitochondrial DNA Analysis: A Community Forum Workshop, 54th Annual Meeting of the American Academy of Forensic Sciences, Atlanta, GA, 2002

Statistics II – Forensic Mixture Interpretation & Analysis, Thirteenth International Symposium on Human Identification, Phoenix, AZ, 2002

Thirteenth International Symposium on Human Identification, Phoenix, AZ, 2002

Brooklyn Law School Symposium, DNA: Lessons from the Past, Problems from the Future, Brooklyn, NY, 2001

Twelfth International Symposium on Human Identification, Promega, Biloxi, MS, 2001

DNA Audit Class, Quantico, VA, 2000

52nd Annual Meeting of the American Academy of Forensic Sciences, Reno, NV, 2000

Fifth Annual Conference on the Future of DNA: Implications for the Criminal Justice System, New York, NY, 2000

Florida DNA Training Session V: DNA 2000, Miami Lakes, FL, 2000

Eleventh International Symposium on Human Identification, Promega, Biloxi, MS, 2000

Casework Guidelines and Complex Mixture Interpretation Workshop, Promega, Biloxi, MS, 2000

Statistics Workshop, Promega, Orlando, FL, 1999

Mitochondrial DNA Sequence Analysis in Forensic Casework Methods and Issues Workshop, Promega, Orlando, FL, 1999

Tenth International Symposium on Human Identification, Promega, Orlando, FL, 1999

50th Annual Meeting of the American Academy of Forensic Sciences, San Francisco, CA, 1998

Florida DNA Training Session IV: STRs - The Next Generation, Orlando, FL, 1998

Ninth International Symposium on Human Identification, Promega, Orlando, FL, 1998

49th Annual Meeting of the American Academy of Forensic Sciences, New York, NY, 1997

Eighth International Meeting on Human Identification, Promega, Scottsdale, AZ, 1997

A Workshop in Statistics for Forensic Scientists, St. Petersburg Junior College, St. Petersburg, FL, 1996

The Seventh International Symposium on Human Identification, Promega, Scottsdale, AZ, 1996

Northwest Association of Forensic Sciences, Salt Lake City, UT, 1996

Human Identification Users Meeting, Rockville, MD, 1996

47th Annual Meeting of the American Academy of Forensic Sciences, Seattle, WA, 1995

Florida DNA Training Session III: Advanced PCR Applications, Altamonte Springs, FL, 1995

The Sixth International Symposium on Human Identification, Promega, Scottsdale, AZ, 1995

The Mid-Atlantic Association of Forensic Scientists Present "The Gilbert and Trias Murders," Gaithersburg, MD, 1995

46th Annual Meeting of the American Academy of Forensic Sciences, San Antonio, TX, 1994

The Fifth International Symposium on Human Identification, Promega, Scottsdale, AZ, 1994

BioEast '94 Workshop, Washington, D.C., 1994

45th Annual Meeting of the American Academy of Forensic Sciences, Boston, MA, 1993

The Second International Symposium on the Forensic Aspects of DNA Analysis, Quantico, VA, 1993

Florida DNA Training Session II: PCR Applications, Orlando, FL, 1993

The Fourth International Symposium on Human Identification, Promega, Scottsdale, AZ, 1993

44th Annual Meeting of the American Academy of Forensic Sciences, New Orleans, LA, 1992

The Third International Symposium on Human Identification, Promega, Scottsdale, AZ, 1992

AmpliType HLA DQα Forensic DNA Amplification and Typing Workshop, 1992.

43rd Annual Meeting of the American Academy of Forensic Sciences, Anaheim, CA, 1991

The Second International Symposium on Human Identification, Promega, Madison, WI, 1991

Eighth International Congress of Human Genetics, Washington, D.C., 1991

Association of Biotechnology Companies, Washington, D.C., 1991

International Symposium on Continuous Cell Lines - An International Workshop on Current Issues, Bethesda, MD, 1991

The Institute of Continuing Legal Education in Georgia, Criminal Law and DNA meeting, Atlanta, GA, 1990

California Association of Criminalist Meeting, Long Beach, CA. (taught course), 1990

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