

**IN THE COURT OF APPEALS
EIGHTH APPELLATE DISTRICT
CUYAHOGA COUNTY, OHIO**

DERRICK WHEAT,	x	
	:	Case No. CA-09-093671
Appellant,	:	
	:	Appeal from Case No. CR-95-324431-C
- against -	:	
	:	
STATE OF OHIO,	:	
	:	
Appellee.	:	
	x	

**BRIEF OF AMICUS CURIAE THE INNOCENCE NETWORK
IN SUPPORT OF APPELLANT DERRICK WHEAT**

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OTHER AUTHORITIES

ASTM E 1588-08, “Standard Guide for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-ray Spectrometry,” § 8.1.1	8
--	---

¹ Counsel for the Network has access to, or maintains copies of, all sources cited herein. Upon request, for the Court’s convenience, the Network would be pleased to submit copies of any such materials to the Court.

Berk et al., Gunshot Residue in Chicago Police Vehicles and Facilities:
An Empirical Study (2007), 52 J. Forensic Sci. 83810

Cardinetti et al., X-ray Mapping Technique:
A Preliminary Study in Discriminating Gunshot Residue Particles
from Aggregates of Environmental Occupational Origin (2004),
143 Forensic Sci. Int'l 1 8

Charles et al., Firearms, A Review: 2004 to 2007, 15th International Forensic Science
Symposium 44, Interpol-Lyon, Oct 23 – Oct. 26; 20078

Gabel & Wilkinson, “Good” Science Gone Bad: How the Criminal Justice System Can Redress
the Impact of Flawed Forensics (2008), 59 Hastings L.J. 1001 14

Garret & Neufeld, Invalid Forensic Science Testimony
& Wrongful Convictions (2009), 95 Va. L. Rev. 12, 4, 18

Innocence Project, Facts on Post-Conviction DNA Exonerations,
<http://www.innocenceproject.org/Content/351.php>..... 1, 2, 3

Innocence Project, “Profiles: Edward Honaker,”
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Innocence Project, “Proven Innocent by DNA, Roy Brown is Fully Exonerated,”
<http://www.innocenceproject.org/Content/424.php>.....3

La Morte, Sleeping Gatekeepers: *United States v. Llera Plaza* and the
Unreliability of Forensic Fingerprinting Evidence Under *Daubert* (2003),
14 Alb. L.J. Sci. & Tech. 17117, 18

Mendoza et al., Evaluating Antimony and Barium Ratios
Found in Elemental Data from Gunshot Residue,
The CAC News: News of the California Ass’n of Criminalists,
3d Quarter 20096, 7, 8

McGuire, The Controversy Concerning Gunshot Residues Examinations,
Forensic Magazine, Aug.-Sept. 2008, *available at*
<http://www.forensicmag.com/articles.asp?pid=222>5, 6, 9

Nat’l Research Council of the Nat’l Academies (2009), Strengthening
Forensic Science in the United States: A Path Forward2, 3, 14

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RULES

Ohio Crim. R. 33(A)(6)	2, 5, 12, 14, 20
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INTERESTS OF THE AMICUS CURIAE

The Innocence Network Inc. (“the Network”) is an association of organizations dedicated to providing pro bono legal and/or investigative services to prisoners for whom evidence discovered post-conviction provides compelling proof of innocence or warrants a new trial. The Network’s 54 current members represent hundreds of prisoners with innocence claims in all 50 states, the District of Columbia, as well as Canada, the United Kingdom, Australia and New Zealand. The Innocence Project, the Network’s founding member organization, developed the post-conviction litigation DNA model that has since exonerated over 200 innocent prisoners. *See, e.g.,* Innocence Project, Facts on Post-Conviction DNA Exonerations, <http://www.innocenceproject.org/Content/351.php> (last visited Nov. 11, 2009) (hereinafter “Project Factsheet”). As perhaps the nation’s leading authority on wrongful convictions, the members of the Network and the Innocence Project’s founders, Barry Scheck and Peter Neufeld (both of whom are members of New York State’s Commission on Forensic Science, charged with regulating all state and local crime laboratories) are regularly consulted by officials at the state, local, and federal levels.

The Innocence Network and its members are dedicated to improving the accuracy and reliability of the criminal justice system in future cases. Drawing on lessons from cases in which convictions have been overturned on the grounds of actual innocence, the Network advocates study and reform designed to enhance the truth-seeking functions of the criminal justice system to ensure that future wrongful convictions are prevented. The Network therefore has a particularly strong interest in cases where, as here, unreliable forensic science played a fundamental role in obtaining a murder conviction.

In this brief, the Network demonstrates that recent advances in forensic science have revealed the extreme unreliability of the gunshot residue (“GSR”) evidence that the State used to

convict Wheat, such that this “new evidence” entitles Wheat to a new trial pursuant to Ohio Rule of Criminal Procedure 33.

PRELIMINARY STATEMENT

There is little dispute that unreliable forensic science techniques have led to the convictions of a disturbing number of innocent persons. *See* Garrett & Neufeld, *Invalid Forensic Science Testimony and Wrongful Convictions* (2009), 95 Va. L. Rev. 1; *see also* Project Factsheet (explaining that invalidated or improper forensic sciences played a role in half of the convictions later proved wrongful through DNA testing). In recent years, both the scientific community and state and federal courts have increasingly recognized that flawed forensic science is seriously impacting the integrity of our criminal justice system. *See, e.g., Melendez-Diaz v. Massachusetts* (2009), __ U.S. __, 129 S. Ct. 2527, 2537, 174 L.Ed.2d 314, 326-327 (cautioning that “[s]erious deficiencies have been found in the forensic evidence used in criminal trials”); *see also* Nat’l Research Council of the Nat’l Academies (2009), *Strengthening Forensic Science in the United States: A Path Forward* (hereinafter “NAS Report”), at “xx” (explaining that the “forensic science system, encompassing both research and practice, has serious problems”).

One of the most serious problems with forensic science is that it is not unusual for forensic disciplines once considered reliable (such that evidence based thereon was introduced at criminal trials) to be partially or wholly discredited after more rigorous scientific evaluation is conducted. For example, courts once credited and accepted such forensic techniques as hair microscopy, handwriting analysis, bite-mark comparisons, firearm tool mark analysis, comparative bullet lead analysis (“CBLA”), and shoe-print comparisons. *See* Project Factsheet.

These techniques now are widely considered to be unreliable and no longer accepted by courts.

*See id.*²

Courts once allowed bite-mark evidence that compared the teeth of the suspect and the marks left at a crime scene, often on the skin of a victim. However, recent scientific studies, as summarized in the 2009 NAS Report, have discredited the scientific basis for bite-mark comparison evidence. *See* NAS Report at 174-76 (noting that the weaknesses of bite-mark science include that no thorough study has been conducted of large populations to establish the uniqueness of bite marks, controlled studies show a high percentage of false positives, and expert “experience,” rather than science, underlies the methodology, introducing “the potential for large bias” among experts). In light of this new data, courts are now reconsidering convictions premised on bite-mark evidence. *See, e.g.*, Innocence Project, “Proven Innocent by DNA, Roy Brown is Fully Exonerated,” <http://www.innocenceproject.org/Content/424.php> (last visited Nov. 11, 2009).

The case of Edward Honaker provides a particularly jarring, although unfortunately not isolated, example of how unreliable forensic science can contribute to the conviction of an innocent person. Honaker was convicted of rape and sexual assault based in part upon the

² *See also, e.g.*, *United States v. Lewis* (S.D. W.Va. 2002), 220 F. Supp. 2d 548, 554 (excluding handwriting expert’s testimony for lack of reliability, noting that “[i]f courts allow the admission of long-relied upon but ultimately unproven analysis, they may unwittingly perpetuate and legitimate junk science”); *Williamson v. Reynolds* (E.D. Okla. 1995), 904 F. Supp. 1529, 1557-58 (reversing a defendant’s death sentence and finding, in part, that admission of “expert hair testimony at appellant’s trial was irrelevant, imprecise and speculative, and its probative value was outweighed by its prejudicial effect”), *aff’d sub nom. Williamson v. Ward* (10th Cir. 1997), 110 F.3d 1508, abrogated on other grounds by *Nguyen v. Reynolds* (10th Cir. 1997), 131 F.3d 1340; *Ragland v. Kentucky* (Ky. 2006), 191 S.W.3d 569, 580 (ordering a new trial for the defendant because the prosecution used the dubious forensic technique of CBLA); *New Jersey v. Behn* (N.J. Super. Ct. App. Div. 2005), 868 A.2d 329, 346 (ordering a new trial for a defendant after CBLA evidence used at his trial was determined to be unreliable, and noting that “the integrity of the criminal justice system is ill-served by allowing a conviction based on evidence of this quality, whether described as false, unproven or unreliable, to stand”).

testimony of a forensic examiner who claimed that a hair found on the victim was “consistent” with Honaker’s hair, and that the possibility that the hair could be someone else’s was “possible” but “unlikely.” See Innocence Project, “Profiles: Edward Honaker,” <http://www.innocenceproject.org/Content/180.php> (last visited Nov. 11, 2009). In fact, there never has been adequate empirical data about the frequency of various class characteristics in human hair to determine whether consistency is a rare or common event. *Id.* DNA evidence tested ten years after Honaker’s conviction established his innocence (and led to his pardon), exposing the unreliability of the hair microscopy evidence used to convict him. *See id.*

The science underlying shoe print comparisons has been revealed to be just as unreliable as hair microscopy. *See* Garrett & Neufeld, 95 Va. L. Rev. at 71-72. For example, Charles Fain was convicted on the basis of expert testimony that the wear patterns on the sole of a person’s shoe are “individualized” to a person’s gait and create correspondingly unique shoe prints (such that a person “would have to have the same characteristic walk” to create the same shoe print). *Id.* at 71. However, no scientific data (then or now) supported the opinion that the effect of a gait on the sole of a shoe is unique. *Id.* at 72. Fain was exonerated by DNA testing conducted after his conviction, exposing the forensic testimony used to convict him as flawed. *See id.*

Similarly, recent scientific advances have revealed that the GSR evidence used to convict Wheat is the result of a forensic technique that is now recognized to be fundamentally flawed and unreliable. As demonstrated herein, there can be no real dispute that the GSR evidence used to convict Wheat would today be excluded under both (1) the principles of *Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993), 509 U.S. 579, 596–97, 113 S.Ct. 2786, 2798-2799, 125 L.Ed.2d 469, 485, as unreliable, and (2) Ohio Rule of Evidence 403(A), as the evidence’s probative value is substantially outweighed by the danger of unfair prejudice and confusion. The

recently discovered information about the unreliability of the GSR evidence introduced at trial, and the fact that this evidence would today be excluded under threshold evidentiary rules, constitutes “newly discovered” evidence that Wheat “could not with reasonable diligence have discovered and produced at the trial” and thus entitles Wheat to a new trial. *See* Crim. R. 33(A)(6).

For those reasons, as set forth in more detail below, the Network urges this Court to determine that the trial court abused its discretion when it ignored this newly discovered evidence and reverse the trial court’s denial of Wheat’s motion for a new trial.

STATEMENT OF FACTS

The Network refers to the facts and procedural history set forth in Appellant Wheat’s brief.

BACKGROUND

GSR consists of a mix of particles created by a rapid high-temperature burning of primer mix that occurs when a firearm is fired. *See* Schwoeble & Exline, *Current Methods in Forensic Gunshot Residue Analysis* (2000) at 12. This residue escapes from the firearm in a vapor or “plume” and settles onto surfaces in the immediate proximity of the weapon. *Id.* at 11. Three elements, lead (Pb), barium (Ba), and antimony (Sb), are present in GSR plumes. *Id.* During the creation of GSR, these three elements fuse together into a single PbBaSb particle. *See* Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 4;³ *see also* McGuire, *The Controversy*

³ At the evidentiary hearing on Wheat’s motion for a new trial, the State stipulated that Dr. Nordby “is an expert in the field of gunshot residue analysis, and he’s qualified.” (Def.’s Tr. of Proceedings, Testimony of Dr. Jon J. Nordby (hereinafter, “Hearing Tr.”) at 17:10-13, Apr. 16, 2009.)

Concerning Gunshot Residues Examinations, *Forensic Magazine*, Aug.–Sept. 2008, *available at* <http://www.forensicmag.com/articles.asp?pid=222> (hereinafter “McGuire”).⁴

I. Recent Scientific Advances Have Revealed that the GSR Identification Test Used in this Case Was Unreliable.

Over the years the scientific community has utilized, and then abandoned, a variety of methods to test for the presence of GSR. For example, the dermal nitrate test, also known as the “paraffin test,” was once considered reliable but later rejected when it was discovered that false positives were generated by numerous sources other than GSR, including fertilizer, matches, urine, and fingernail polish. *See* Mendoza et al., *Evaluating Antimony and Barium Ratios Found in Elemental Data from Gunshot Residue*, *The CAC News: News of the California Association of Criminalists*, 3d Quarter 2009 (hereinafter “Mendoza”), at 26.

At Wheat’s trial, the State’s GSR expert utilized the atomic absorption spectroscopy (“AAS”) test, which is a “bulk” or “batch” analytical technique. (Trial Tr. at 507:15–508:11; Hearing Tr. at 31:11-19.) In the AAS test, a nitric acid solution breaks down particles collected, such as those from a suspect’s person and clothing, into individual elements.⁵ *See* Schwoeble & Exline at 16-17. A laboratory technician then simply determines whether any of those individual elements are lead, barium, or antimony, which are the elements present in GSR. *See id.* at 17.

⁴ As described above, this brief uses the term “GSR” to refer to the particles created by the burning of primer mix when a weapon is fired. GSR is distinguished from nitrites, which are partially burnt gunpowder particles that may be released when a weapon is fired. (*See* Trial Tr. at 561:10-23, 567:5-17; Hearing Tr. at 23:1-12.)

⁵ The State introduced GSR and nitrite evidence collected from four separate areas: (1) Wheat’s hands; (2) Wheat’s jacket; (3) Johnson’s glove; and (4) Glover’s automobile. Rosenberg testified that she used the AAS test to identify the substances on Wheat’s hands and on Johnson’s glove and the Modified Griess Test to identify nitrites on Wheat’s jacket. The State used a Firearms Examiner to report the findings on Glover’s automobile.

Subsequent to Wheat's trial, the forensic science community effectively abandoned AAS testing because scientific advances have proven AAS testing to be an extremely unreliable method of identifying GSR. *See* Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 6 n.2 (citing Schwoeble & Exline for a discussion of the developments in GSR testing). The AAS test is of extremely limited value because it *only* determines whether any of the three individual elements are present in the sample, but *cannot* indicate whether such elements ever were combined into fused GSR particles. (*See* Hearing Tr. at 35:3-36:23; 49:5-10.) *See also* Reis et al., A New Method for Collection and Identification of Gunshot Residues from the Hands of Shooters (2003), 48 J. Forensic Sci. 1269; Schwoeble & Exline at 28-29.

Because the AAS test cannot identify fused particles, it cannot differentiate the morphology of GSR particles from particles that originate from other sources. (*See* Hearing Tr. at 36:11-25.) This limitation is extraordinarily problematic because forensic science has established that numerous environmental sources, including many common household and industrial substances, contain these same elements, *i.e.*, lead, barium, or antimony. Common sources of lead, barium, and antimony in the environment include paints, pigments, enamel, printing and artists' colors, rubber processing materials, glass, ceramics, explosives, matches, brake pads, and fireworks. (Trial Tr. at 596:7-15; Hearing Tr. at 22:12-17, 69:23-71:9.) *See also* Schwoeble & Exline at 16-17; Romolo & Margot, Identification of Gunshot Residue: A Critical Review (2001), 119 Forensic Sci. Int'l 195, 197; Mendoza at 28 (noting that these elements can also come from dyes, storage batteries, bearing metals, shielding sheet, cable coverings, plumbing materials, battery plates, type metal, solder, deoxidizing alloys of tin, copper, lead, and zinc, in radiography, in heat-treating baths for tempering of steel, in laser crystals, leather

tanning, photographic chemicals, insecticides, paper products, hardening alloys, Babbitt metals, and pewter utensils).

Today, a much more reliable methodology, the Scanning Electron Microscopy/Energy Dispersive Spectroscopy (“SEM/EDS”) test, is employed almost universally to detect GSR because, unlike the AAS method, it permits a laboratory technician to draw critical distinctions between the morphology of GSR and other substances. (*See* Hearing Tr. at 53:23-54:6.) *See also* Charles et al., *Firearms, A Review: 2004 to 2007*, 15th International Forensic Science Symposium 44, Interpol-Lyon, Oct. 23–Oct. 26, 2007 (citing Cardinetti et al., *X-ray Mapping Technique: A Preliminary Study In Discriminating Gunshot Residue Particles from Aggregates of Environmental Occupational Origin* (2004), 143 *Forensic Sci. Int’l* 1); Mendoza at 26; Schwoeble & Exline at 18. In other words, this analysis can do what AAS testing cannot—differentiate the morphology of GSR from other substances containing lead, barium, and antimony, such as those that would be characteristic of brake pads. *See* Ex. D to Mot. for a New Trial (ASTM E 1588-08, “Standard Guide for Gunshot Residue Analysis by Scanning Electron Microscopy/Energy Dispersive X-ray Spectrometry”) (hereinafter the “ASTM Standard”), § 8.1.1⁶; *see also* Ex. I to Mot. for a New Trial (Wright & Trimpe, “Summary of the FBI Laboratory’s Gunshot Residue Symposium, May 31–June 3, 2005,” *Forensic Sci. Commc’ns*, July 2006, http://www.fbi.gov/hq/lab/fsc/backissu/july2006/research/2006_07_research01.htm) (hereinafter “FBI Symposium”), at 3 (noting that respondents agreed that differentiating between

⁶ ASTM International (“ASTM”), originally known as the American Society for Testing and Materials, is one of the largest voluntary standards development organizations in the world. *See* ASTM International, <http://www.astm.org/> (last visited Nov. 11, 2009). It is a source for technical standards for materials, products, systems, and services. *See id.* While there is no single standard governing GSR analysis, the ASTM standard is influential in the scientific community and is intended “to develop a common classification system” and to “bring firearms experts to consensus on what is GSR.” Mendoza at 27.

brake-pad particles and GSR particles was possible when taking into consideration the entire population, morphology, and elemental distribution of the particles and that studies reached similar conclusions regarding fireworks).

Prominent crime laboratories throughout the nation now require morphological identification of fused particles to identify GSR. For example, the Cuyahoga County Coroner's office (the lab that analyzed the samples in this case) now requires that a technician find a *fused* PbBaSb particle that exhibits GSR morphology, as well as additional supporting particles. *See* Ex. F to Mot. for a New Trial (Trace Evidence Standard Operating Procedure) at 87, 89. Likewise, the Federal Bureau of Investigation ("FBI") required a minimum of three PbBaSb *fused* particles, and the presence of "other particles consistent with a GSR-type environment" to identify GSR. FBI Symposium at 6. The U.S. Army Crime Laboratory required a minimum of four PbBaSb *fused* particles to identify GSR. *See* McGuire at 3.

II. Recent Recognition of the High Potential for GSR Contamination in the Law Enforcement Environment Has Revealed that the GSR Collection in this Case Was Unreliable.

There also have been significant discoveries and advances since the time of Wheat's trial that reveal the high potential for GSR contamination in the law enforcement setting. Although the general concept of secondary transfer in the context of GSR was understood at the time of Wheat's trial, what was unknown then was the full extent of the contamination problem in the law enforcement environment and, specifically, the fact that the circumstances under which testing samples were collected in this case introduced a significant likelihood that the samples collected were tainted.

Studies in major metropolitan areas throughout the United States have found an alarmingly high number of GSR particles on the surfaces of the back seats of police vehicles, holding cells, interrogation tables and chairs, and on handcuffs, as well as on police officers

themselves; these studies further determined that defendants held in police custody may easily become contaminated from those, or other, sources prior to GSR testing. *See* FBI Symposium at 4-5; Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 9 (citing Berk et al., Gunshot Residue in Chicago Police Vehicles and Facilities: An Empirical Study (2007), 52 J. Forensic Sci. 838); Thompson & Nethercott, "Forensics," *The Champion* (June 2005), at 50. For example, a recent study by the Colorado Bureau of Investigation of the backseats of patrol vehicles detected GSR particles in 19 of the 26 vehicles tested. *See* FBI Symposium at 4. A Los Angeles study found a similar result: 45 of the 50 samples taken from the backseat "cupping area" where restrained individuals can rest their hands during transport tested positive for GSR particles. *See id.* at 5.

The newfound awareness of the high potential for contamination in the law enforcement environment has prompted a more intense focus on GSR collection procedures. In particular, law enforcement agencies now recognize the impact that the "delta t ," the length of time between the shooting and when a defendant's hands are sampled, has on the reliability and probative value of GSR test results. *See* FBI Symposium at 7 (explaining that there is "no probative value in examining samples taken more than 4 to 6 hours after arrest"); *see id.* (stating that the FBI allowed a five-hour delta t and the Virginia Department of Forensic Science recommends a maximum delta t of four to six hours); *see also* Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 5 (stating that "hand swabs for GSR detection taken any time other than *immediately* after a shooting * * * are seldom productive") (emphasis *sic*). (*See also* Hearing Tr. at 32:11-33:7.) To mitigate potential contamination, participants in the FBI Symposium unanimously "agreed that GSR sampling should be done at the scene, where permissible, and as expeditiously as possible." FBI Symposium at 4. Participants also widely agreed that if samples could not be

obtained at the scene, then a suspect's hands should be bagged with plastic protective bags before the suspect is placed in a police vehicle to reduce the possibility of contamination in the police environment. *Id.*

A recent Minnesota court's decision demonstrates how the high potential for contamination in the law enforcement environment significantly impacts the reliability of GSR evidence. In *Moua*, the court excluded GSR evidence as unreliable due to issues of contamination in the police environment, holding that it had "no probative value for the trier of fact." *Minnesota v. Moua* (Minn. Dist. Ct. July 7, 2006), No. K5-05-7335, at 23. In that case, police officers did not take GSR samples at the scene, failed to bag defendants' hands, and transported defendants to the station in a police car. *Id.* at 18–19. Not until after the defendants spent approximately four to six hours in the police station were their hands finally tested for GSR. *Id.* at 4. The *Moua* court held that the state failed to establish that the procedures used to collect testing samples were reliable. *Id.* at 18. Given as much, the court explained that "all that the 'presence of particles unique to gunshot residue' can categorically prove is that an individual was in an environment where GSR was present." *Id.* at 22. Because of the "countless ways in which the defendant could pick up GSR," the trier of fact would have to "speculate" as to the source. *Id.* The court ultimately concluded that it:

[did] not believe that the GSR evidence presented in this case would add any precision or depth to the jury's ability to conclude whether or not the defendant fired a gun, was present when a gun was fired, handled a gun or ammunition, or picked up the GSR from the back of a squad car, a police officer's hands, the bench in the police department's hallway, from another person detained in that hallway, from the restroom, from the conference table, from the handcuffs, or from any other source not mentioned here.

Id. at 22–23.

ARGUMENT

The Ohio Supreme Court has set forth a six-part test to determine whether a new trial should be granted and its holding subsequently has been applied to motions pursuant to Ohio Rule of Criminal Procedure 33. *See State v. Petro* (1947), 148 Ohio St. 505, 36 O.O. 165, 76 N.E.2d 370; *State v. Siller*, Cuyahoga App. No. 90865, 2009-Ohio-2874, at ¶¶ 44-49. Under the first factor of this test, the newly discovered evidence must disclose a reasonable probability that it will change the result if a new trial is granted.⁷ *Siller*, at ¶¶ 44-49. This requirement is satisfied here.

If the current understanding of the limitations of AAS testing and the high potential for contamination in the law enforcement environment had been known at the time of Wheat's trial, the State's GSR evidence would have been excluded as unreliable under the principles of *Daubert*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed. 2d 469, and Ohio Rule of Evidence 702. The GSR evidence introduced at trial fails to meet the threshold of reliability mandated under *Daubert* because the AAS test does not accurately identify GSR and thus, among other things, does not support Rosenberg's testimony. Further, the technique used to collect the "GSR" evidence in this case entirely undermines any shred of reliability in the State's GSR evidence. Because the GSR evidence is insufficiently reliable, it could not aid the jury in reaching accurate results, and thus would be excluded under the principles of *Daubert*.

⁷ Appellant Wheat's brief demonstrates that all six factors of the test are satisfied. The Network's brief primarily addresses the first factor, and in particular, that the GSR evidence introduced at trial would be inadmissible today. In addition, this Court has articulated a slightly different test than *Petro*. *See Siller*, at ¶¶ 44-49. In particular, the *Siller* court held that "reasonable probability," rather than "strong probability," is the correct standard. *Id.* at ¶ 47 (holding that "reasonable probability" means evidence proffered undermines our confidence in the outcome of the trial). The Network respectfully submits that the evidence in this case meets either test.

In addition, the State's GSR evidence would have been excluded under Ohio Rule of Evidence 403(A). First, the GSR evidence used to convict Wheat was of little (if any) probative value because the AAS test is unable to determine whether the individual elements identified originated from GSR or another environmental source that contains these same elements. Any minimal probative value to reporting the presence of individual elements on defendants' hands and clothing is reduced further because recent scientific developments show that there is a substantial danger that those elements were the product of contamination from the law enforcement environment. Second, the minimal relevance of the GSR evidence here is substantially outweighed by its potential for creating unfair prejudice and confusion of the issues. A danger inherent to this type of forensic evidence is that lay jurors will assign undue weight to the mere fact that individual elements of lead, barium, and antimony were identified, without considering alternative explanations for their presence. Moreover, in light of our current understanding of GSR, the State's GSR expert, Sharon Rosenberg, significantly overstated the ability of the GSR test to identify the shooter, thus conclusively demonstrating unfair prejudice to Wheat.

Under either the principles of *Daubert* or Rule 403(A), the GSR evidence would be excluded from trial today. Therefore, because it is indisputable that the GSR evidence was an important factor in Wheat's conviction and also was otherwise highly prejudicial to Wheat's defense (i.e., it colored the jury's perception of all evidence introduced at trial), the advances in GSR evidence constitute newly discovered evidence that demonstrates that it is likely that there would have been a different result at trial. This recently discovered information merits a new

trial for Wheat under Ohio Rule of Criminal Procedure 33(A)(6). The trial court therefore abused its discretion in denying Wheat's motion for a new trial.⁸

I. In Light of Scientific Advances, The GSR Evidence Introduced at Trial Would Be Inadmissible under *Daubert* Principles.

In light of advances in GSR science, the GSR evidence introduced at trial fails to meet the threshold of reliability established by the Supreme Court in *Daubert*. 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed. 2d 469; *see also Miller v. Bike Athletic Co.* (1998), 80 Ohio St. 3d 607, 616, 687 N.E.2d 735, 743 (adopting the *Daubert* standard); *see also* Ohio Evid. R. 702(C). *Miller* describes the standard for admitting expert testimony as follows: “[T]he ultimate touchstone is helpfulness to the trier of fact, and with regard to reliability, helpfulness turns on whether the expert’s technique or principle is sufficiently reliable so that it will aid the jury in reaching accurate results.” *Miller*, 80 Ohio St. 3d at 614, 687 N.E.2d at 741 (internal quotation marks omitted).

⁸ The incremental nature of the scientific process has proven problematic for defendants seeking new trials on the basis that a particular forensic testing technique (central to their conviction) is discredited. One source explains the difficulty as follows:

On the one hand, evidence must cast sufficient doubt upon a forensic testing technique in order to support a claim. Thus, prisoners must wait for scientists to do research that discredits the technique to a satisfactory degree. On the other hand, once evidence that does sufficiently discredit the technique becomes available, a prisoner may have to bring a claim based on that evidence quickly in order to comply with applicable time limits. Consequently, the prisoner must negotiate the fine balance between waiting to gather enough evidence to demonstrate that a forensic technique is unreliable and risking the possibility that more conclusive research will be done but will not come to the prisoner’s attention.

Gabel & Wilkinson, “Good” Science Gone Bad: How The Criminal Justice System Can Redress The Impact of Flawed Forensics (2008), 59 Hastings L.J. 1001, 1022. Because of barriers like these, the NAS Report explained, “the legal system is ill-equipped to correct the problems of the forensic science community.” NAS Report at 53. Here, although there can be no bright line test to determine when the GSR evidence at trial was discredited, Wheat has struck the “fine balance” by moving promptly for a new trial after the “new evidence” became available.

The exclusion of this evidence under *Daubert* principles is addressed thoroughly in Appellant Wheat's brief, and thus the Network will not cover this same ground. In sum, the AAS test utilized by Rosenberg could not employ morphological identification to discern fused particles of GSR, and thus does not accurately identify GSR to any degree of scientific certainty, despite Rosenberg's testimony to the contrary. (*See, e.g.*, Trial Tr. at 632:20-633:10 (Rosenberg agreeing that she could "rul[e] out any other sources" based on her findings).) Compounding this problem, the elements Rosenberg analyzed were the product of a collection technique that introduced the high potential for contamination and thus added another layer of unreliability. For these reasons, as addressed in more detail in Appellant's brief, a court would today exclude the GSR evidence introduced at trial under the principles of *Daubert*.

II. In Light of Scientific Advances, the GSR Evidence Introduced at Trial Would Be Inadmissible Because It Would Be More Prejudicial Than Probative.

As an alternative ground to *Daubert*, in light of advances in GSR science, the GSR evidence introduced at trial would be excluded under Ohio Rule of Evidence 403(A). Rule 403(A) provides that "evidence is not admissible if its probative value is substantially outweighed by the danger of unfair prejudice, of confusion of the issues, or of misleading the jury." Evid. R. 403(A); *see also State v. Myers* (2002), 97 Ohio St.3d 335 2002-Ohio-6658, 780 N.E.2d 186, at ¶ 91 (explaining that even relevant evidence may be excluded under Ohio Rule of Evidence 403(A)).

The evidence from the AAS test was of low probative value because the test results could not determine to any degree of scientific certainty whether the elements identified were deposited as a result of any of the defendants discharging a firearm or originated from another source. Specifically, the AAS test could not discern whether the lead, barium, and antimony identified were fused into PbBaSb particles or whether they were individual elements.

Rosenberg therefore could not make a morphological identification to determine whether the substance that she found on defendants was actual GSR or instead originated from a different source. *See* Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 11 n.19 (“[T]he failure to perform morphological analysis undermines the conclusion that the samples contain actual GSR particles.”). In other words, there is little or no probative value to Rosenberg’s testimony regarding the AAS test results because there exists a significant possibility that the elements she found originated from sources other than GSR (for example, that the barium derived from barium sulphate, a compound found in paper; the lead derived from leaded paint; or the antimony derived from antimony oxide, a fire retardant in clothing).⁹

Any minimal probative value to the mere identification of these individual elements is diminished even further because the technique used to collect GSR evidence in this case introduced a significant likelihood of contamination. In fact, the circumstances surrounding the collection of GSR evidence from the defendants constitute a textbook example of a situation with a high potential for contamination in a law enforcement environment because: (i) Defendant Wheat’s hands were not tested or bagged at the scene of his arrest (Trial Tr. at 752:18-53:4); (ii) Wheat was transported by police car to the station (*see id.* at 752:18-753:4); and (iii) Wheat was detained at the police station for *at least eight hours* before the GSR samples were collected. (*See id.* at 474:3-18, 643.)¹⁰ Indeed, given the potential for contamination in the law

⁹ The Firearms Examiner’s testimony about the lead found on Glover’s automobile would be of little or no probative value for precisely the same reasons. In addition, with respect to the two nitrite particles on Wheat’s jacket, Rosenberg testified that these were “not a whole lot” or what “we call a random amount.” (Trial Tr. at 569:7-9.)

¹⁰ The detection of the elements on Wheat’s palms is indicative of contamination. *See* Ex. B to Mot. for a New Trial (Report of Dr. Jon Nordby) at 11 (“When hands are placed on a table typically the *palms* of the hands receive the greatest exposure to whatever trace materials may be found on the table’s surface.”) (emphasis *sic*).

enforcement environment and that Wheat's hands were not bagged or sampled at the scene, and that the delta *t* in this case was *eight hours*, most modern laboratories in the country would today refuse to even conduct the GSR analysis in the first instance. See FBI Symposium at 7. The *Moua* court recognized this problem when it excluded all GSR evidence from trial because of the high potential for contamination in the law enforcement environment and the unreliability of the collection methods employed. See *Moua*, No. K5-05-7335, at 20 ("The irregularities of the collection procedure resulted in an analysis of samples with meaningless conclusions."). Therefore, there is little or no probative value to Rosenberg's testimony about AAS test results because it establishes only that defendants were in an environment that contained elements that comprise GSR, which is unremarkable given that they were in police custody.¹¹

In addition to lacking probative value for the reasons discussed above, the GSR evidence generates an extremely high danger of unfair prejudice to Wheat in two critical respects. First, there is a significant danger that lay jurors could not appreciate that the AAS test only has limited probative value, insofar as, on a best case basis, it only is able to identify individual elements that *might* have come from GSR, but also were likely to have originated from sources in the environment other than GSR. This problem is compounded by the fact that jurors are likely to assign undue weight to expert evidence. See La Morte, *Sleeping Gatekeepers: United States v. Llera Plaza and the Unreliability of Forensic Fingerprinting Evidence Under Daubert* (2003), 14 Alb. L.J. Sci. & Tech. 171, 208–09 ("[F]orensic science experts are the most persuasive of all witnesses testifying at trial."); see also Garrett & Neufeld at 9 ("Juries may give

¹¹ Likewise, the GSR findings with respect to Wheat's jacket, Johnson's glove, and Glover's automobile are unreliable and have little or no probative value because of the high likelihood of contamination in the law enforcement environment.

special weight to testimony by forensic scientists; the Supreme Court has cautioned that “[e]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it.” (citing *Daubert*, 509 U.S. at 595, 113 S.Ct. at 2798, 125 L.Ed. 2d at 484)). One study explained that

approximately one-quarter of previous jurors would have changed their verdict to not guilty had scientific evidence not been submitted. * * * [T]he authors predicted that “[t]he presence of forensic science evidence, regardless of the certainty with which it connects the defendant with the crime, is predicted to result in higher rates of conviction.”

La Morte at 208-09 (citation omitted); *see also United States v. Frazier* (11th Cir. 2004), 387 F.3d 1244, 1263 (“[E]xpert testimony may be assigned talismanic significance in the eyes of lay jurors * * * .”). On balance, the minimal probative value of the State’s GSR evidence is substantially outweighed by its potential to have a devastating effect on Wheat’s defense.¹²

Moreover, Rosenberg’s testimony would be unfairly prejudicial because, in light of our current understanding of GSR science, she significantly overstated the import of the AAS test results. For example, contrary to today’s understanding of GSR, Rosenberg testified that she was able to eliminate the possibility that the lead, barium, and antimony came from sources other than GSR. (Trial Tr. at 632:20-633:10 (agreeing that she could “rul[e] out any other sources” based on her findings).) The government emphasized this testimony in its closing stating that Rosenberg “ruled out any other sources.” (*Id.* at 1194:10-12.) As discussed above, advances in GSR science show that both Rosenberg’s testimony and the State’s closing remarks are flatly

¹² In addition, the fact that the State’s experts reported GSR findings from four different collection areas conferred unwarranted legitimacy on the findings. In fact, each of these findings is individually of low probative value because of the limitations of the AAS test and high potential for contamination in the law enforcement environment. Therefore, the cumulative nature of the State’s evidence was unfairly prejudicial to Wheat.

wrong in that the AAS test cannot provide any information whatsoever about the sources of elements.

Rosenberg also testified that the barium and antimony on defendants *was* GSR. For example, she testified as follows:

Q. *And we can draw the conclusion then that either Mr. Derrick Wheat had fired a weapon, or his hands were close by a weapon being fired?*

A. *That is correct.* We have to give the option that if someone is very near a gun being discharged, that some of this material may be deposited. So, that from the laboratory standpoint, we can simply say, that it is consistent with firing or being in a very, very close proximity to a gun being discharged.

(Trial Tr. at 562:24–563:10 (emphasis added); *see also id.* at 566:24-567:1 (“Normally, when you get a significant reaction on these tests, you consider that as being around a gun being discharged.”); 598:20–599:2; 626:12-19; 641:14-23.) Moreover, the State emphasized Rosenberg’s testimony in its closing arguments, stating, “[a]nd the test that was attributed to the hands of this defendant, Mr. Wheat, were covered with barium, and antimony. And because they were of such a significant level, *it was gunshot residue. Okay. That’s what [Rosenberg] testified to.*” (*Id.* at 1193:9-16 (emphasis added); *see also id.* at 1195:1-6 (“But she is here to testify as an expert, and within reasonable scientific certainty, she said the material was left as a result of this defendant firing a weapon.”).)

Rosenberg even testified that her findings were of the highest certainty possible without having actually witnessed the crime. (*See id.* at 598:20–599:2 (the difference between consistent with and positive is “[w]ithout actually seeing the incident, I have to say it is consistent with gunshot residue”).) In other words, she suggested that she could not use any stronger terms to describe her findings only because she was not an eyewitness to the crime. The government emphasized her misleading testimony stating that she “testified that, you know, if I saw him fire the weapon, I would say, beyond all possibilities. But I didn’t see him fire the gun, therefore I

am saying within reasonable scientific certainty. That's the highest standard." (*See id.* at 1305:19-25.) In fact, the inherent scientific limitations of the AAS test, among other things, render her statements grossly misleading.

Put simply, there is no way that the GSR evidence introduced at trial (especially Rosenberg's testimony) could aid the trier of fact without unfairly prejudicing Wheat by coloring the jury's perception of all the evidence introduced at trial. Given what we now know about GSR, the GSR evidence introduced at trial would be inadmissible today under Ohio Rule of Evidence 403(A) because it has little or no probative value while being unfairly prejudicial and confusing. Moreover, the reasons for its exclusion under Rule 403(A) apply with equal force to the principles of *Daubert*. *See Miller*, 80 Ohio St. 3d at 614, 687 N.E.2d at 741. These facts constitute newly discovered evidence that demonstrate a reasonable probability of a different result at trial under Ohio Rule of Criminal Procedure 33(A)(6).

CONCLUSION

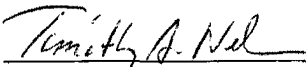
For the foregoing reasons, the Network urges this Court to determine that the trial court abused its discretion when it ignored this newly discovered evidence regarding the GSR evidence introduced at Wheat's trial and reverse the trial court's denial of Wheat's motion for a new trial.

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CERTIFICATE OF SERVICE

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