

FILED IN OFFICE

IN THE SUPERIOR COURT FOR THE STATE OF GEORGIA
COUNTY OF FLOYD

AUG - 8 2019

C. Dillard

CLERK

STATE OF GEORGIA,

v.

GUY WILLIAM SEWELL.

CIVIL ACTION NO. 17CR00057JFL004 ¹⁶⁷⁵ c

ORDER

This case came before this Court on July 29, 2019, to determine the admissibility of DNA analysis evidence at trial from the TrueAllele® software. The State filed a Motion requesting that this Court take judicial notice of DNA analysis results reached through utilization of TrueAllele® software. The State asserted that the evidence has reached a state of scientific certainty and moved to admit it under *Harper v State*, 249 Ga. 519 (1982) without a hearing. The Motion to Request Judicial Notice was denied due to the relatively short period of time the software has been in use and accepted by courts. The Court then held a *Harper* hearing on the admissibility of the evidence. After considering the evidence presented at the hearing, the Court makes the following findings of fact and conclusions of law.

DNA Analysis and TrueAllele®

DNA analysis has routinely been admitted in the State of Georgia for a number of years. In addition, as DNA technology has evolved over time, Georgia

Courts have kept up with the evolution by continuously reassessing the reliability and validity of the latest DNA testing methods.

In approximately 2009, TrueAllele® was introduced as a computer program that uses a mathematical model based on Bayesian statistical analysis and the Markov chain Monte Carlo algorithm to interpret DNA. It does this through probabilistic genotyping. The interpretation is conducted objectively through forensic biology techniques conducted without a person. The software system processes information at a more rapid pace than could be performed by a human.

A sample of DNA from a single person is interpreted easily. However, when two or more people contribute DNA to a mixture, the data becomes more uncertain. To identify whose DNA is in the mixture, TrueAllele® looks at the allele pairs at a genetic loci and uses probability to determine the genotype. That genotype is compared to a suspect relative to a general population to determine the inclusionary or exclusionary match statistic. This process is done for 24 genetic loci, 3 of which are sex-determining only.

The match statistics for each loci are multiplied, and the final match statistic is reported as a single number which explains how much more or less likely it is for the DNA in the sample to match the suspect than a member in the general population. This number can be called the likelihood ratio (LR).

The Role of TrueAllele Software in DNA Analysis in the Present Case and in Georgia

In the Present Case

Emily Schmidt, M.S.F.S., testified at the hearing as an expert in Forensic DNA Analysis and TrueAllele. As the Forensic Biology Technical Leader at the Georgia Bureau of Investigation Division of Forensic Science, she is responsible for the day-to-day quality and technical operations of the Forensic Biology Section of the GBI, which entails research and validation, quality assurance and quality control, as well as oversight of technical policies and procedures.

Mrs. Schmidt testified that the GBI purchased TrueAllele software in 2015 and implemented TrueAllele testing in 2018. She conducted TrueAllele validation studies at the GBI for approximately 2 ½ years and created policies and procedures regarding the software prior to its implementation. Two of 37 validation studies, the results of which guarantee the accuracy of the testing, were conducted by the GBI, and some of the other 35 studies were conducted by independent agencies not associated with law enforcement. Mrs. Schmidt is author of one of the GBI validation studies and co-author of the other.

TrueAllele software was found to be reliable in all of the validation studies, including those conducted by the GBI. Since implementation of the TrueAllele software in 2018, the GBI has issued reports in more than 250 cases using the software. All results, including the report in the present case, are peer reviewed by another scientist. Ten crime labs in the country have purchased the software, and eight are "live" and conducting DNA analysis using the software. As advances are made in technology, there have been updates in the TrueAllele software, and Mrs.

Schmidt testified that a new version of the software went “live” within the last week. Numerous treatises, studies and articles were admitted by the State through Mrs. Schmidt’s testimony to assist the court.

Ashley Hinkle, a GBI scientist in the forensic science division, and an expert in forensic DNA testing, testified that she performed the TrueAllele testing in the present case. Her report was admitted as State’s Exhibit 5.

In Georgia

TrueAllele has been accepted as scientifically reliable under the *Harper* standard in several Georgia jurisdictions. In January of 2019, in State v. Nundra, Judge Earnest held in Decatur County that the probabilistic genotyping program satisfies the *Harper* standard. The court noted that the technique has reached a scientific stage of verifiable certainty and “rests upon the laws of nature.” Subsequently, on March 22, 2019, in State v. Howell, Judge Palmer held in Coweta County that TrueAllele satisfies the *Harper* standard. On April 7, 2019, in Ben Hill County, in State v. Battle, Judge Chasteen held that TrueAllele analysis is scientifically reliable, that the *Harper* standard was satisfied and that testimony concerning the results of the testing were admissible at trial. In Battle, the court relied on evidence presented in the form of expert testimony from Emily Schmidt and Ashley Hinkle, who testified in the present case, and on exhibits and treatises submitted on behalf of the State as shown in the record. Most recently, on May 29, 2019, Judge Pannell admitted TrueAllele results by the GBI after a contested hearing in United States v. Lenard Gibbs, 17CR-207-CAP-CMS.

TrueAllele®'s Widespread Acceptance

TrueAllele® has been used in over 500 criminal cases across the country. Dr. Perlin, a creator of the program and expert in DNA analysis, has testified about the program in over 50 trials. TrueAllele® results have been admitted into evidence over challenges 24 times including once at the federal level and multiple times in other districts of Georgia. Courts accepting True Allele® evidence include California, Florida, Indiana, Louisiana, Maryland, Massachusetts, Michigan, Nebraska, New Hampshire, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, the United States Federal Courts (Eastern District of Virginia), and the United States Marine Corps.

TrueAllele® has been used by prosecutors, defendants, and even innocence projects. Outside of its uses in the court system, TrueAllele® has been trusted and accepted. After the disaster on 9/11, TrueAllele® was used to identify remains of victims. The federal government has also used TrueAllele® to help create DNA standards.

Reliability and Validation

Probabilistic modeling like that done by TrueAllele® using the Markov Chain Monte Carlo algorithm is not new and has been successfully used to solve complex

problems since the 1950s.¹ The underlying mathematic principles are not at issue. Nor can it be said that TrueAllele® presents any issue with bias. The program examines samples and prepares data prior to the receiving any data on the DNA of a suspect. The validity and reliability of TrueAllele® have also been proven time and time again.

TrueAllele® has been tested in validation studies by Cybergentics and crime laboratories for over 10 years.² Not including the numerous other independent validation studies, seven peer-reviewed studies have been published and have examined the reproducibility, specificity, and sensitivity of the program. These studies showed that TrueAllele® was “sensitive and specific in its ability to include true donors and exclude or find no statistical support for nondonors.”³ Furthermore, “even with complex four-person mixtures [TrueAllele®] is capable of performing an accurate, sensitive, and specific analysis.”⁴ And the program showed consistent behavior despite the number of contributors in a sample.⁵

The United States Scientific Working Group on DNA Analysis Methods (SWGDM) introduced guidelines with a higher threshold for mixture

¹ Greenspoon SA, Schiermeier-Wood L, and Jenkins BC. Establishing the limits of TrueAllele Casework: a validation study. *Journal of Forensic Sciences.* 2015; 60(5): 1263.

² Perlin MW, Hornyak J, Sugimoto G, Miller K. True Allele genotype identification on DNA mixtures containing up to five unknown contributors. *Journal of Forensic Sciences.* 2015; 60(4): 870.

³ Greenspoon SA, Schiermeier-Wood L, and Jenkins BC. Establishing the limits of TrueAllele Casework: a validation study. *Journal of Forensic Sciences.* 2015; 60(5): 1278.

⁴ *Id.*

⁵ Perlin MW, Hornyak J, Sugimoto G, Miller K. True Allele genotype identification on DNA mixtures containing up to five unknown contributors. *Journal of Forensic Sciences.* 2015; 60(4): 864-65.

interpretation in 2010.⁶ Based on these guidelines, the Virginia Department of Forensic Science looked into probabilistic genotyping and had Cybergenetics use TrueAllele®, the validated system, in 144 cases.⁷

Another study measuring the sensitivity, specificity, and reproducibility of TrueAllele's results was presented to the DNA subcommittee of the New York State Commission on Forensic Science, and TrueAllele® was unanimously recommended for approval for use.⁸ This same study noted that the "reproducibility, coupled with greater accuracy, establishes the validated system's reliability for forensic casework and experimental science."⁹

These peer-reviewed studies, as well as numerous other studies, show that TrueAllele® is a system that has been validated and is reliable.

Conclusion

After hearing expert testimony and reviewing the evidence presented and studies and exhibits submitted, the Court finds that the TrueAllele® program satisfies the *Harper* standard. TrueAllele's method of probabilistic genotyping has been repeatedly tested and reviewed and has now reached a stage of verifiable

⁶ Perlin MW, Dormer K, Hornyak J, Schiermeier-Wood L, and Greenspoon S. TrueAllele Casework on Virginia DNA mixture evidence: computer and manual interpretation in 72 reported criminal cases. PLOS ONE, 2014; 9(3): e92837. at 2.

⁷ *Id.*

⁸ Perlin MW, Belrose JL, Duceman BW. New York State True Allele Casework validation study. Journal of Forensic Sciences. 2013; 58(6): 1459.

⁹ *Id.* at 1466

scientific certainty. TrueAllele® does produce reliable results with an error rate lower than that of other genotyping methods already used in the court system.

For the foregoing reasons, the Court finds TrueAllele® reliable, and the testimony regarding the TrueAllele® results is admissible at trial.

IT IS SO ORDERED this 7th day of August, 2019.



Kay Ann Wetherington
Floyd County Superior Court
Rome Judicial Circuit

cc: Morgan Bottger
Sean J. Lowe