IN THE COURT OF COMMON PLEAS
CUYAHOGA COUNTY
CRIMINAL DIVISION

STATE OF OHIO	)	Case No. 13-CR-575691
Plaintiff,	)	
	)	Judge Maureen Clancy
vs.	)	
	)	
MAURICE SHAW	)	**MOTION TO QUASH**
Defendant,	)	

Now comes the State of Ohio, by and through Timothy J. McGinty, Cuyahoga County Prosecutor and his undersigned assistant, and requests that this Honorable Court deny Defendant's motion to compel discovery of the source code of the TrueAllele system for the reasons more fully discussed in the attached brief in support.

Respectfully submitted,

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<u>BRIEF IN SUPPORT</u>

Defendant requests this Honorable Court compel the state to disclose material that

the state does not have, that he is not entitled to, that is proprietary, and that is

unnecessary for resolution of any issues in this case. An overwhelming amount of

precedent demands that Defendant's request be denied. In addition to the instant brief,

the State intends to submit a notarized affidavit by Dr. Perlin. A signed version is

currently attached for this Court's review which will be supplemented with a notarized

version as soon as possible.

i. Defendant does not need access to proprietary source code to raise a challenge under Evid. R. 702.

In general, in order to be admissible, expert testimony must be reliable. The

standard for admission of expert testimony is set forth in Evid. R. 702. Evid. R. 702

provides:

A witness may testify as an expert if all of the following apply:

(A) The witness's testimony either relates to matters beyond the knowledge or experience possessed by lay persons or dispels a misconception common among lay persons;

(B) The witness is qualified as an expert by specialized knowledge, skill, experience, training, or education regarding the subject matter of the testimony;

(C) The witness' testimony is based on reliable scientific, technical or other specialized information. To the extent that the testimony reports the result of a procedure, test or experiment, the testimony is reliable only if all of the following apply:

1. The theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from accepted knowledge, facts or principles;

2. The design of the procedure, test, test or experiment validly implements the theory;

3. The particular procedure, test, or experiment was conducted in a way that will yield an accurate result.

The source code is unnecessary to establish that TrueAllele is reliable under Evid. R. 702(C). The core mathematical theory upon which the software is based has been extensively studied and its specific application to TrueAllele has been published in peer-reviewed scientific journals, and the system's accuracy has been confirmed with independent validation studies. Because reliability under Evid. R. 702(C) can be thoroughly evaluated without the source code, Defendant does not require the source code to mount his challenge. Therefore, this Honorable Court should deny Defendant's motion to compel discovery of TrueAllele's source code.

A. TrueAllele's core mathematical foundation has been published

The mathematical concepts upon which TrueAllele is based have been published without the release of its source code and have been made available for validation. In fact, the mathematical principle(s) TrueAllele uses were developed in 1953.[1] Although Defendant contends that TrueAllele is a "black box" and that the source code is necessary to establish how the software works, this contention is entirely without merit. A black box system is defined as "a device, system, or object which can be viewed in terms of its input, output and transfer characteristics without any knowledge of its internal workings. Its implementation is opaque (black)."[2] TrueAllele does not operate as a black box. The application of well-known mathematical principles to the TrueAllele system specifically has been published in peer reviewed scientific articles:

- Mark W. Perlin & Beata Szabady. Linear Mixture Analysis: A Mathematical Approach to resolving Mixed DNA Samples J. Forensic Sci 2001; 46(6):1372-7

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[1] Richey, Matthew. *The Evolution of Markov Chain Monte Carlo Methods.* The Mathematical Association of America, May 2010.
[2] Wikipedia, "Black box" (http://en.wikipedia.org/wiki/Black_box) Accessed June 17, 2014.

- Mark Perlin & Alexander Sinelikov. <u>An Information Gap in DNA Evidence Interpretation</u>. PLoS ONE 4:12 e8327
- Mark W. Perlin, Matthew M. Legler, Cara E. Spencer, Jessica L. Smith, William P. Allan, Jamie L. Belrose, Barry W. Duceman. <u>Validating TrueAllele DNA Mixture Interpretation</u>. J. Forensic Sci. 2011; 56(6): 1430-1447

Because the basic principles underlying the operation of the TrueAllele system have been published, it is inaccurate to describe TrueAllele as a "black box" system. The core mathematical principles have been reviewed by experts in the field. Therefore, the source code is unnecessary to elucidate the basic internal workings of TrueAllele.

B. <u>TrueAllele's interpretation of DNA mixtures can be independently verified</u>

Defendant is not entitled to TrueAllele's source code. In *State v. Mahan*, 8th Dist. Cuyahoga No. 95696, 2011-Ohio-5154, the Eighth District upheld the trial court's denial of a motion to compel discovery of source code of software called "Peer Spectre." The software in *Mahan* was intended to aid in the investigation of internet child pornography. The defendant believed the "Peer Spectre" source code would reveal the functionality and calibration of the software and that the source code was material to his challenge of the software's reliability and methodology. The "Peer Spectre" software was copyrighted, not distributed to anyone, and its use was restricted to law enforcement.

Similarly, in *United States v. Chiaradio*, 684 F.3d 265, 278 (1st Cir. 2012) the court upheld the denial of the defendant's motion to compel discovery of the source code of software called "LimeWire," a specialized software that was used by the FBI in investigations of child pornography. In *Chiaradio*, the defense had requested the source code in order to challenge the reliability of the technology. *Id*. at 277. The court determined that the defendant's motion to compel was properly denied because the reliability of the program was established without the source code through

demonstration of how the results of an investigation using the software could be independently verified. *Id.* at 278.

Here, the reliability of TrueAllele may be established without the source code through published independent testing. In *Chiarado*, the court found that the reliability of the software could be established even in the absence of peer review. There are a large number of peer reviewed studies and studies performed by state and international police laboratories that demonstrate the functionality and reliability of the TrueAllele system. A partial listing of these is provided in Section II, *infra*. TrueAllele has been thoroughly tested using laboratory-created DNA mixtures; that is, mixtures with a known composition. Using these types of mixtures, it is possible to verify that TrueAllele produces results that are expected based on the composition of the mixtures tested. This is far more extensive than the verification procedure described in *Chiaradio*, where the court held that the source code was not necessary. Defendant has ample means to verify TrueAllele's operation. Therefore, Defendant's motion to compel production of the source code should be denied.

   C. TrueAllele's reliability has been established by numerous peer-reviewed scientific publications

There is no legitimate dispute over TrueAllele's reliability. Contrary to Defendant's assertion, TrueAllele has been the subject of rigorous peer review. In addition to the publication of the basic mathematics, TrueAllele has been validated by independent laboratories who have published reports regarding its reliability. In *Commonwealth of Pennsylvania v. Foley*, 38 A.3d 882, 888 (2012), the court held that there was no legitimate dispute over the reliability of Dr. Perlin's DNA testimony that was based on

analysis by the TrueAllele software. The court found that "scientists can validate the reliability of a computerized process even if the 'source code' underlying the process is not available to the public". *Id.* at 889. As the court noted in *Foley*, TrueAllele has been tested and validated in peer reviewed studies. *Id.* Indeed, one study used laboratory-generated DNA samples and found that quantitative analysis performed analysis performed by TrueAllele was much more sensitive than qualitative analysis such as that performed by the FBI. *Id.*

The following is a list of validation studies of the TrueAllele system that have been published in peer-reviewed scientific books and journals:

Mass Casualty Identification: World Trade Center

- Perlin MW. Mass Casualty Identification through DNA analysis: Overview, problems and pitfalls. In Okoye MI, Wecht CH, eds. *Forensic Invetigation nad Management of Mass Disasters.* Tucson, AZ: Lawyers and Judges Publishing Co; 2007; 23-30
- Perlin MW. Identifying Human Remains using TrueAllele technology. In Okoye MI, Wecht CH, eds. *Forensic Invetigation nad Management of Mass Disasters.* Tucson, AZ: Lawyers and Judges Publishing Co; 2007; 31-38

State Crime Laboratory Validation

- Perlin MW, Belrose JL, Duceman BW. New York State TrueAllele Casework validation study. J. Forensic Sci 2013; 58(6): 1458-66
- Perlin MW, Dormer K, Hornyak J, Schiermeier-Wood L, Greenspoon S. TrueAllele Casework on Virginia DNA Mixture Evidence: Computer and

Manual Interpretation in 72 reported Criminal Cases. PLoS ONE
2014:9(3):e92837

Unpublished Crime Laboratory Validation

- Perlin MW, Hornyak J, Dickover R, Sugimoto G, Miller K. <u>TrueAllele</u>
  <u>Genotype Identification DNA Mixtures Containing up to Five Unknown</u>
  <u>Contributors</u>. Kern Regional Crime Laboratory, Bakersfield, CA. February 15,
  2014.
- Internal Validation of TrueAllele Genetic Calculator as an Expert Assistant for
  Reads and Review of Data from Reported Sexual Assault Evidence.
  Massachussetts
- Australia TrueAllele Validation Report New South Wales Police, Australia.
  September, 2011.

Independent Laboratory Validation

- Kadash K, Kozlowski BE, Biega LA, Duceman BW. <u>Validation Study of the</u>
  <u>TrueAllele Automated Data Review System.</u> J Forensic Sci. 2004;49(4): 1-8

D. <u>TrueAllele is proprietary software that Defendant seeks to have disclosed to Dr.</u>
   <u>Perlin's competitors.</u>

In addition to being unnecessary to analysis under Evid. R. 702, the source code

should not be released as a matter of public policy. TrueAllele is proprietary and is the

result of over a decade of work by Dr. Perlin. Release of this information to Defendant

and to Dr. Perlin's competitors would cause unjustified economic harm. In Ohio, a trade

secret is defined as information that that satisfies both of the following:(1) It derives

independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use; (2) It is the subject of efforts that are reasonable to maintain its secrecy. R.C. 1333.61(D). While the underlying math and intense review has allowed TrueAllele's accuracy to be independently verified, the source code itself remains confidential. This is typical of commercially developed source code. TrueAllele derives independent economic value and Dr. Perlin has taken efforts to maintain the integrity and secrecy of the source code. Therefore, the information is privileged and protected.

The need for the source code is insufficient to trump Dr. Perlin's interest in protecting his trade secret from his competitors. In *Splater v. Thermal Ease Hydronic Systems, Inc.* 169 Ohio App.3d 514, 863 N.E.2d 1060, the Eighth District held that the plaintiff's need for trade secret formulae would not overcome the potential harm to nonparty manufacturer as a result of disclosure, where the defendant was one of the manufacturer's competitors. The court is required to balance the need to preserve a trade secret with a party's right to discover material that is relevant and reasonably necessary. *Id.* at 518. In *Splater*, an expert wished to access the trade secret chemical formulae of a nonparty's plastic products because the expert felt it would be "helpful" in confirming his conclusions. *Id.* at 519. The court found that this fell far short of the type of justification necessary for the disclosure of the trade secret to the plaintiff, especially because the defendant is a direct competitor of the manufacturer. *Id.*

Here, Defendant has ample data available to him in the many published works describing TrueAllele's validation. Because of the availability of this data, Defendant

has nothing to gain from examination of the source code. Defendant's expert may feel the source code is "helpful", but like the case in *Splater*, this falls far short of the justification necessary for the disclosure of a trade secret to a competitor. Defendant has more than enough data on which to evaluate TrueAllele based on the available data. Because there is ample data upon which to base an evaluation of TrueAllele, the potential harm to Dr. Perlin's business far outweighs any need Defendant has for the source code.

In addition to being unnecessary to analysis under Evid. R. 702, the source code should not be released as a matter of public policy. In *Foley*, the court correctly noted that TrueAllele is proprietary software. *Id*. It would not be possible to market TrueAllele if it were available for free. Here, not only does TrueAllele remain propriety software as the *Foley* court notes, but the defense expert, Dr. Dan Krane, has a pecuniary interest in a competing system through the company that he founded in 2002, Forensic Bioinformatics Inc. A nondisclosure agreement is in no way sufficient to protect Dr. Perlin's interests in TrueAllele if the source code is revealed to one of his direct competitors. See *Splater v. Thermal Ease Hydronic Systems, Inc.* 169 Ohio App.3d 514, 863 N.E.2d 1060**.** The burden on Dr. Perlin is simply too great in light of TrueAllele's established reliability to reveal the source code to a competitor. As such, this Court should deny Defendant's motion to compel discovery of TrueAllele's source code.

TrueAllele is closed soured software. Most commercial software is closed source, meaning the source code is not released. Companies invest considerable resources in creating and testing software. Making the source code available would allow

competitors to copy the ideas and methods without making such an investment, and threatens the very existence of the software and the company. In forensic DNA analysis, the main software relied upon by virtually every U.S. crime lab is closed source. This includes Life Technology's "Genemapper ID" dsoftware for generating and analyzing DNA data signals, the FBI's "Popstats" software for producing DNA match statistics, and Microsoft "Excel" software for conducting additional data analysis.

Open source software, for which the software is freely available, tends to be short (less than 1000 lines of code) non-commercial problems written by academics or hobbyists, without extensive application testing or scientific validation. Advocates for open source software often have a pecuniary interest in receiving compensation through an alternative business model. For example, academics often receive funding for developing open source software. Specifically, Gill, cited by the defense, has received a 5 million euro grant for developing open source software for interpreting DNA evidence. These grant recipients have an understandable stake in advocating for the alternative business model that funds their own work and advocating against more standard competing models.

ii. Defendant's cited authority is inapplicable to the source code at issue here.

Defendant relies on several cases regarding the "Intoxilyzer" breath alcohol system in support of his argument. However, these cases are inapplicable because they deal with the release of information when there was a known defect in the source code. There is no known defect in TrueAllele; it has been subject to rigorous and ongoing testing and validation.

In all of Defendant's cited authority, release was authorized due to deficiencies in the Intoxilyzer source code. For example, in *Freeman v. Commissioner of Public Safety* 2009 WL 1919931 (Minn. App.), the defendant submitted evidence of potential problems with the Intoxilyzer source code. See also *State v. Underhal*, 767 N.W.2d 677 (Minn.) (defendant presented evidence of defects in breath-test source code). In *Florida v. Kenneth Arnold Baker*, cited by Defendant, the court refers to "sufficient concerns about the inner workings of the Intoxilyzer 5000 and 800 that warrants disclosure" of the source code. In order to have the source code disclosed, there was first a showing that there were concerns about the operation of the Intoxilyzer, not simply because it was newer technology. No similar concerns exist in this case and, because defendant cannot point to any, he is not entitled to the privileged material.

Furthermore, In *People v. Cialino* 14 Misc.3d 999, 831 N.Y.S.2d 680 the court held that source codes of the Intoxilyzer were not discoverable. Because there was no showing that the source code was related to the reliability of the machine, the court characterized the request for the source code as a "fishing expedition for trade secrets held by a third party". *Id.* at 1001. In *Cialino*, it was incumbent upon the defendant to show that a software change had altered the reliability of the machine, which had been independently tested by the Department of Health. *Id.* The court found that the Department of Health testing was sufficient to establish its reliability. *Id.*

Here, there are no deficiencies or concerns. Certain versions of the Intoxilyzer had known defects. In *Cialino*, for example, the court refers to several updates that had occurred to increase stability, increase specificity, and increase accuracy at low breath alcohol concentrations. 14 Misc.3d at 1000. Courts in Ohio noted that in early versions,

its breath alcohol readings were affected by interference from various radio frequencies. *See e.g. State v. Bennett* 66 Ohio App.3d 595, 585 N.E.2d 897 (Ohio App. 11 Dist. 1990) (explaining that Intoxilyzer units at that time were subject to interference from police radios). In each case, the deficiencies came to light as a result of use of the machine, not from examination of the source code of an adequately functioning instrument. There is no deficiency that may be revealed by examination of TrueAllele's source code that would not have been apparent during hundreds of trials of the software. Similar to the Department of Health testing in *Ciliano*, the extensive peer-reviewed testing of TrueAllele has established TrueAllele's reliability. Because the known defects and issues with the operation of the Intoxilyzer are not present with TrueAlelle, there are no concerns with its operation that warrant disclosure of the source code. Therefore, this Court should deny Defendant's motion to compel discovery of TrueAllele's source code.

Respectfully submitted,

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<u>CERTIFICATE OF SERVICE</u>

I hereby certify that a copy of the foregoing State's *Motion to Quash* has been sent, via regular U.S. Mail, and via e-mail, this _____ day of June 2014 to:

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