STATE OF OREGON,	)	Case No. 22CR21973
	)	
v.	)	
	)	
NATHANIEL CURTIS FREEMAN,	)	OPINION AND ORDER RE: DEFENDANT'S MOTION TO EXCLUDE TOOLMARK AND FIREARM IDENTIFICATION EVIDENCE
	)	
	)	
	)	

A hearing was held on January 9, 2023, to address defendant's motion to exclude expert witness testimony anticipated to be offered by the State at trial regarding the examination and analysis of firearm toolmarks. I have considered the testimony of Shawn Malikowski, the State's proffered expert witness on firearms toolmark examination, including defense counsel's cross-examination. I have also considered the briefing submitted and case law cited by the parties. For the reasons set forth below, I conclude the proposed expert testimony is admissible at trial. Defendant's motion to exclude this testimony is denied.

I. Oregon's Guideline Expert Testimony Factors

In *State v. Brown*, 297 Or 404 (1984), Oregon was one of the first jurisdictions to reject the "general acceptance in the relevant scientific community" standard that numerous courts followed for decades. *See Frye v. United States*, 293 F 1013, 1014 (D.C.Cir.1923). In *Brown*, Oregon adopted a more flexible multi-factor "gatekeeper" approach. 297 Or at 416-17. This approach, which is now the dominant paradigm in state and federal courts, sets forth guideline

reliability factors trial courts are to consider in determining whether proffered expert testimony is sufficiently reliable to be admissible.

The guideline factors identified in Oregon's case law include: (1) the methodology's general acceptance in the field; (2) the expert's qualifications and stature; (3) the use which has been made of the technique and whether there are maintained standards on the use of the technique; (4) the care with which the technique was employed in this case; (5) the potential rate of error; (5) the existence of specialized literature;(6) the novelty of the methodology; (7) the extent to which the technique relies on the subjective interpretation of the expert; (8) the acceptance of the technique by other scientists in the field; (9) the presence of safeguards in the characteristics of the technique; (10) analogy to other scientific techniques whose results are admissible; (11) the nature and breadth of the inference adduced; (12) the clarity and simplicity with which the technique can be described and its results explained; (13) the extent to which the basic data are verifiable by the court and jury; (14); the availability of other experts to test and evaluate the technique; and (15) the probative significance of the evidence in the circumstances of the case. *State v. O'Key*, 321 Or 285, 299-300 n.15, 899 P2d 663 (1995); *Marcum v. Adventist Health System/ West*, 345 Or 237, 244 n.7 (2008).

These factors are not exclusive or exhaustive, and do not constitute a "mechanical checklist" that will all be relevant in every case; nor is any one of these factors decisive. *See State v. Southard*, 347 Or. 127, 134, 218 P.3d 104 (2009) ("Not all of the factors that the court identified in *Brown* and *O'Key* will necessarily apply in a given case, nor has the court required that all or even a majority of the applicable factors be satisfied for evidence to be admissible."). Rather, trial courts are to consider the factors that are relevant for an overall determination of reliability of the proposed evidence and decide whether the evidence "will assist the trier of fact

to understand the evidence or to determine a fact in issue . . ." ORE 702; *Southard*, 347 Or. at 303. Even if the proffered evidence is based on scientifically valid methodology and the evidence is relevant, the evidence will be excluded if the probative value of the evidence is substantially outweighed by a danger that the evidence will mislead the jury, confuse issues or interfere with the jury's factfinding function. *Southard*, 347 Or at 140.

II. Application of Guideline Factors

A. General Acceptance in the Field

Ballistics evidence, or as it is more accurately called, toolmark and firearm identification analysis, relies on trained experts who identify, isolate and closely examine microscopic toolmarks made on bullets and cartridge cases by guns. Frequently, and in this case, the proposed expert test fires a particular gun to compare distinctive toolmarks[1] made in the test fired bullets and cartridge cases to the toolmarks on the bullets and cartridge cases collected at a crime scene. If, upon microscopic side-by-side comparison, the examiner finds toolmarks that are sufficiently aligned and matched, the examiner will form and offer an expert opinion that the toolmarks made on multiple bullets or cartridge cases were made by the same gun. This type of evidence has a long been used in Oregon courts with experts offering their opinion on matching cartridge cases and bullets with particular firearms. *See* OREGON EVIDENCE, 6th Ed (2019), Laird C. Kirkpatrick, § 702.04[3][a] at 653 (listing "ballistics tests" as "approved scientific evidence" *citing State v. Henderson*, 182 Or 147, 187, 184 P2d 392 (1947)).

Scientific understanding and inquiry change and evolve, and courts should always be open to new questions that are raised about previously accepted scientific principles. Defendant

[1] Firearm toolmarks include, among other things, fire pin stamp marks on the back of a cartridge case, marks made on a cartridge case as it is ejected from the gun's ejection port, or rifling marks made on a bullet as it spins down the barrel of a gun.

points out that some courts and scientific organizations have called into question the reliability and admissibility of toolmark and firearm identification. *See e.g., United State v. Adams,* 444 F Supp 3d 1248, 1267 (D Or 2020) (excluding evidence relating to the proposed expert's methodology and conclusions matching particular toolmarks on bullets and cartridge cases to toolmarks from test fires from the firearm at issue); *see also President's Council of Advisors on Sci. & Tech., Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature Comparison Methods (2016) ("PCAST Report").* Given that toolmark and firearm identification evidence has been questioned recently, the Court will carefully consider the remaining reliability factors.

B. The Proposed Expert's Qualifications and Stature; The Use Made of the Technique and Standards on the Use of the Technique; The Care Used in Applying the Technique in this Case

The record created at the January 9, 2023, hearing establishes that the State's proposed expert has extensive training and expertise in firearms and firearm toolmark examination. Over the past twenty years, Mr. Malikowski has fielded thousands of requests for examination of firearms and toolmarks made on cartridge cases and bullets. He is a current member of the Association of Firearm and Toolmark Examiners and frequently attends this organization's annual conference and reviews their quarterly journal. Mr. Malikowski has also toured gun manufacturing and ammunition facilities to see firsthand how guns and ammunition are manufactured, which has aided his understanding of how ammunition behaves in the field, how toolmarks are made and why toolmarks vary from gun to gun.

In his testimony, Mr. Malikowski testified in detail about the process he applied in this case. In this case, Mr. Malikowski identified the handgun at issue as a Springfield St. Victor AR-style pistol. Mr. Malikowski made eight test fires from the handgun at issue with the 5.56 mm green tip ammunition that was seized by the State in a search. He first determined,

examined and compared the objective class characteristics of the bullets and cartridge cases recovered at the crime scene and the bullets and cartridge cases from the test fires. These objective class characteristics include the general shape of the firing pin and the location and general shape of other toolmarks left on the cartridge cases, the caliber of the bullets, and the general rifling marks on the bullets, which allows determination of the direction of the bullets' spin. Using these objective general class characteristics, the proposed expert can determine whether it is possible that the bullets and cartridge cases recovered from the crime scene and the bullets and cartridge cases from the test fires were fired out of the same gun.

Mr. Malikowski determined, based on objective class characteristics of the crime scene bullets and cartridge cases and the test fire bullets and cartridge cases, that the bullets and cartridge cases recovered at the crime scene *could* have been fired from the gun at issue.[2] He then proceeded to closely examine and compare: (1) the rifling marks on the bullets; and (2) the firing pin and ejection toolmarks on the cartridge cases from the bullets and cartridge cases from the test fires and the bullets and cartridge cases obtained at the crime scene.

Mr. Malikowski testified that he carefully examines the toolmark sizes, locations, distinctive patterns, and where he sees a potential match, he lines up the toolmark ridges and grooves in these toolmarks on separate cartridge cases or bullets in side-by-side three dimensional microscopic images. Mr. Malikowski explained that when he sees sufficient agreement in the distinctive toolmarks at the microscopic level, and the width, depth and locations of the microscopic ridges and groove patterns line up in visual agreement, he forms the opinion, as he did in this case, that a cartridge case or bullet recovered from the crime scene was

[2] Although the Adams court disallowed proposed expert testimony regarding whether the toolmarks on the cartridge cases from the test fires matched the cartridge cases recovered at the crime scene, the court allowed the proposed expert to testify about the matching objective class characteristics of the cartridge cases and bullets at issue. *Adams*, 444 F3d at 1266.

fired from the same gun used in the test fire that generated a test fire cartridge case or bullet. Mr. Malikowski explained that at the microscopic level, even guns sequentially manufactured in the same factory on the same day will show variation in their toolmarks at the microscopic level, in that the ridges and groove patterns will noticeably vary because of the microscopic wearing of the metal parts used to manufacture the guns. Using this technique, Mr. Malikowski formed the opinion that six of the cartridge cases recovered at the crime scene and two of the three bullets recovered at the crime scene were fired from the gun he examined and test fired.[3]

Following Mr. Malikowski's examinations and conclusions, one of Mr. Malikowski's colleagues at the Oregon State Crime Lab goes through a second round of examination of the bullets and cartridge cases. Mr. Malikowski explained that this second examination is an entire new second look at the bullets and cartridge cases to determine whether the second examiner agrees with his conclusions. In this case, the second examiner agreed with Mr. Malikowski's conclusions.

Based on the record from the January 9, 2023, hearing, the Court concludes that the proposed expert's experience and qualifications, and the careful and detailed explanation of the expert's technique weigh in favor of reliability and admissibility of the proposed testimony.

C. The Novelty of the Technique, the Existence of Specialized Literature, and Subjectivity

Evaluating and matching intricate patterns of firearm toolmarks at the microscopic level is not a new or novel technique. As discussed above, the technique has been used for decades and there is an established professional organization that regularly publishes articles on the technique and new developments in the field or advanced techniques to better identify and

[3] Mr. Malikowski found one of the bullets recovered at the crime scene was "inconclusive" meaning he could not determine whether this bullet was fired by the gun that was test fired.

analyze toolmarks at the microscopic level. The court in *Adams* recognized firearm toolmark examination as a long-standing practice with a professional organization, but nonetheless concluded that, in that case, the expert's testimony of matching toolmarks was unscientific as it was "almost entirely subjective and inscrutable." *Adams*, 444 F3d at 1258.

Ultimately, the conclusion of whether toolmarks on bullets and cartridge cases are sufficiently matched with analysis of the width, depth and precise locations of microscopic toolmarks or whether they noticeably vary to form opinions that bullets and cartridge cases were or were not fired out of the same firearm requires subjective analysis of complex microscopic patterns and locations of toolmarks. However, the fact that proposed expert must apply his expert subjective judgment to determine whether firearm toolmarks are sufficiently matched should not disqualify the technique as unscientific.

Expert recognition and analysis of complex patterns and shapes is a feature of many important scientific inquiries. Interpretation of medical studies, such as MRIs, ultrasounds, and cellular pathology examinations frequently requires scientific experts to evaluate and grade images, signals and patterns, including expert subjective interpretation of these shapes and patterns. Handwriting experts and fingerprint analysis similarly closely examine distinctive matching microscopic patterns and shapes. Frequently, these analyses cannot be reduced to entirely quantitative measurements, but rather rely on the highly trained and experienced expert to identify, carefully examine and then exercise trained subjective judgment to draw conclusions from their close analyses of complex patterns and shapes.

The State's proposed expert in this case used his training and understanding of the mechanics of firearms to identify and evaluate at the microscopic level the toolmarks made on bullets and cartridge cases, including the precise location of these toolmarks and whether the

complex microscopic lines and ridges of the marks match. The fact that the determination is not entirely objective and requires the expert to apply some subjective and qualitative expert judgment to form an opinion regarding whether toolmarks are sufficiently matched is a factor that weighs against the reliability of the technique. However, this does not make the technique unscientific or inadmissible.

D. The Potential Error Rate; The Presence of Safeguards; and Availability of Other Experts

In excluding firearms toolmark matching evidence, the *Adams* Court was concerned about the potential error rate of the technique. The parties' submissions cite to various studies indicating that the error rate for the technique could be as high as 2.2%. *See also Adams*, 444 F3d at 1264. The *Adams* court concluded that the potential error rate of 2.2% was unacceptably high and could result in a wrongful conviction rate of 1 out of every 46 cases. *Id.* at 1264-65. But this assumes that the State's case succeeds or fails based entirely on the accuracy of the proposed firearm toolmark evidence. In most cases, the proposed firearm toolmark evidence will be just one piece of evidence proffered by the State. Presenting the finder of fact with Mr. Malikowski's opinions along with information about the uncertainties and potential error rates of firearm toolmark evidence will be helpful to the finder of fact in assessing the overall body of evidence presented at trial.

Mr. Malikowski further testified that the cartridge cases and bullets he analyzed are reviewed anew by a second examiner within the State's crime lab, who either verifies or disagrees with the conclusions. In addition, the complete data set, including the bullets and cartridge cases and the magnified images of the microscopic toolmarks evaluated by the proposed expert are readily available to defendant, who could have his own expert review and evaluate Mr. Malikowski's conclusions. As discussed above, the practice of firearm toolmark

evaluation has been around for decades and includes a well-established national organization. It stands to reason that there are qualified experts who defendant could hire to evaluate and criticize the work and conclusions drawn by the State's proposed expert.

The fact that the data used by the State's expert has been checked by another qualified firearm toolmark examiner and that same data set can be reviewed and evaluated by an expert hired by defendant substantially mitigates the risk that an unchallenged false positive firearm toolmark evidence will be presented to the factfinder. The relatively low potential error rate of the technique used. as well as the safeguards in place to protect against and challenge false positive results from the technique. weigh in favor of the reliability and admissibility of the proposed expert testimony.

After weighing the relevant reliability factors, the Court concludes that the factors, on balance, weigh in favor of the reliability of the State's proposed expert opinion testimony. Thus, the Court must consider whether the proposed expert testimony is helpful to the trial of fact and that its probative value will not be substantially outweighed by any dangers that the evidence will mislead or confuse the jury or unfairly prejudice the defendant.

III. Balancing Probative Value of the Proposed Expert Testimony Against Potential Unfair Prejudice

Defendant argues that the potential error rate and the danger that the jury will defer to the expert's opinion matching the toolmarks on the bullets and cartridge cases should result in exclusion of the evidence. However, as discussed above, there are important safeguards in place to prevent the jury from hearing erroneous or unchallenged firearm toolmark evidence. Moreover, on cross examination and/or with presentation of its own expert, defendant will be able to elicit testimony regarding the subjective component of the expert opinion evidence and that studies have shown that the technique used is not immune from errors. Thus, the jury will

be able to assess the expert testimony, as well as the limitations and potential fallibility of the expert's technique in performing its critical fact-finding function.

Based on the record, the proposed expert testimony, properly vetted through the adversary system, will be helpful to the jury and the probative value of this evidence will not be substantially outweighed by any danger that the jury will be fooled or misled by the evidence. To the contrary, a properly instructed jury will be fully capable of weighing the probative value of the proposed expert testimony, along with the potential limitations and error rates of the expert's technique, in the context of all of the evidence that is presented at trial.

IV. CONCLUSION

For the reasons set forth above, defendant's motion to exclude the State's anticipated firearm toolmark identification testimony and evidence is denied. Defendant will be given the opportunity to present, via cross examination or direct examination of his own qualified expert, the limitations of the technique, including the reliance on the expert's subjective judgment, and the potential error rates of the technique.

Dated: March 28th, 2023.

David F. Rees
Circuit Court Judge