

# Establishing a forensic science commission in Wisconsin

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**Executive Summary:** The criminal justice system depends on forensic science methods to analyze evidence collected following the commission of crimes. Yet, scientific investigations such as the 2009 National Research Council (NRC) report on forensic science reveal troubling limitations in forensic techniques applied today (National Research Council 2009). Since the report, federal and state agencies have made only limited progress in reforming forensic science practices. Furthermore, in 2017, U.S. Attorney General Sessions dissolved the National Forensic Science Commission, charging states to establish their own regulations (Hsu 2017). Many states have not addressed two critical points: (1) improvement of scientific clarity and standards of forensic methods, and (2) evaluation of current and future forensic practices. Scientific evidence is essential in many cases in criminal courts; therefore, states must prioritize improving the quality and reliability of forensic science methods. We recommend establishing a forensic science commission for the state of Wisconsin to improve the soundness of forensic science, certify forensic facilities, and investigate major complaints. A commission with a strong scientific foundation can bolster the credibility of the criminal justice system, safeguard against wrongful convictions, and ensure public safety.

## I. Nationwide issues in forensic science

Advancements in technology have proven vital for law enforcement. However, this progress has also underscored certain weaknesses in forensic practices. As recorded by The Innocence Project and the National Registry of Exonerations, 39% - 46% of wrongful convictions nationwide that were overturned using DNA evidence were cases with faulty forensic evidence, making imprecise or misleading evidence a significant contributing factor in false convictions (Laporte 2018).<sup>1</sup> In 2006, Congress asked the NRC to conduct a scientific investigation into forensic science practices. This

study ultimately concluded that with the exception of DNA analysis, no forensic science method has been held to a rigorous or consistent standard (National Research Council 2009). Seven years later, the President's Council of Advisors on Science and Technology (PCAST) evaluated several forensic techniques commonly used in court cases, including bite-mark, fingerprint and firearm, shoe tread, and DNA-mixture analysis (PCAST 2016). PCAST concluded these practices regularly accepted in courts lacked empirical testing, resulting in staggeringly high error rates and a severe lack of reliability. Like all scientific methods, forensic science techniques should require scientific validation and demonstrable accuracy prior to implementation.

<sup>1</sup> This sentence is corrected from the original version of the published text. The previous wording misrepresented the findings of the referenced research.

One striking example of varying forensic techniques and the inconsistent results they generate can be found in mixed DNA analysis. When investigators find a biological sample containing material from two or more unidentified individuals, they can use specific computer software to analyze the DNA content of the sample and separate the individual DNA profiles (Bieber et al. 2016). Not surprisingly, this type of DNA analysis is more complex than DNA analysis from a single source (PCAST 2016, Bieber et al. 2016). Problems resulting from these genotyping systems can be seen in the acquittal of Oral Hillary, who had been charged with murder (Augenstein 2016, New York v. Oral Nicholas Hillary 2016). The two DNA mixture analysis programs commonly accepted in courts, TrueAllele and STRmix, tested DNA collected from the victim but yielded contradicting results on whether Oral's DNA was present, leading to his acquittal (Augenstein 2016). In addition to the lack of consistent protocols for interpretation of DNA mixture results, some companies, like Cybergenetics, creators of TrueAllele, have resisted giving access to the underlying algorithms so they can be evaluated scientifically (Kwong 2017). However, many judges allow such DNA mixture software to be used. In fact, despite the controversy surrounding DNA mixture analysis programs, TrueAllele has been used in more than 500 cases since 2009 (Wennersten 2015, Palazzolo 2015). To prevent miscarriages of justice, courts should examine whether a given algorithmic system has been validated and refuse to admit evidence that lacks empirical support.

## **II. Key forensic science issues in Wisconsin: Wrongful convictions, lack of legislative reform, and financial and societal costs**

The Wisconsin criminal justice system has reformed and removed some antiquated forensic techniques, but only after miscarriages of justice. In 2003, Steven Avery was exonerated after serving 18 years on a conviction for sexual assault and attempted murder that was based on hair fiber analysis DNA testing exonerated Avery and identified the true perpetrator (Post-Crescent Media 2016). Avery's wrongful imprisonment led to the establishment of the Avery Task Force. This group included prosecutors, law enforcement professionals, judges, defense attorneys, law professors, and victims' rights groups. The committee reviewed the criminal

justice system, and its recommendations led to the passage of Assembly Bill 648/Senate Bill 315 in 2005 (Dykes 2006). This bill aimed to minimize wrongful convictions by reforming protocols for evidence collection and appeals but did not propose changes focused on fallacious forensic analysis, such as the hair fiber evidence originally used to convict Avery.

Misapplications of forensic science lead to erroneous convictions and come with financial and societal costs. When an innocent person is convicted of a crime, the guilty party remains at large, capable of committing further crimes. For example, Chante Ott of Milwaukee was convicted of a rape-murder in 1996 and exonerated in 2009, based on DNA analysis (Vielmetti 2015). The true perpetrator committed a total of six rape-murders, two during Ott's imprisonment. In addition to such societal costs, imprisonment costs must also be examined. Since 1989, 56 exonerees have been released in Wisconsin (National Registry of Exonerations 2018), seven of whom were convicted based on misleading or false forensic evidence. These innocent people served a total 78 years in Wisconsin State Correctional Facilities (National Registry of Exonerations 2018) at a rate of \$38,600 per year per inmate (Mai and Subramanian 2017), costing \$3 million in state tax dollars. The Center on Wrongful Convictions calculated the imprisonment, litigation, county jail, claims court, and settlement costs for 85 exonerations from 1989–2010 in Illinois and found that the total cost to taxpayers was \$214 million, or an average of \$7.8 million per year (Conroy and Warden 2011). Furthermore, in almost all cases, the state compensates exonerees, increasing the cost to taxpayers. For example, in Wisconsin, Avery received \$400,000 and Ott received \$6.5 million (Vielmetti 2015, Associated Press 2006).

## **III. Developments in Wisconsin: Federal monetary support, scientific collaborations, and failed attempts at a forensic science commission**

Federal support for amending forensic science practices and remedying issues in government institutions has increased. In 2015, the Wisconsin Department of Justice (DOJ) was awarded \$4 million in grants to aid in testing accumulated unanalyzed sexual assault kits through the Wisconsin Sexual Assault Kit Initiative (WiSAKI) (Wisconsin Sexual Assault Kit Initiative 2018). Federal funding has also

spurred interdisciplinary collaborations. In 2017, Dr. Kevin Ponto at the University of Wisconsin-Madison partnered with the Dane County Sheriff's Office to tackle crime scene processing (Rivedal 2017). This joint effort received federal funding through the DOJ to measure the effectiveness and practicality of virtual reality tools and 3D-capture technology in crime scene investigations. These tools arose because diagramming a scene is a tedious process that may prevent investigators from completing other tasks. Additionally, details may be missed, and human error can be introduced. Yet with a 3D laser, this same work can be accomplished by one person within hours using a more objective methodology (Rivedal 2017, Chinavare 2017). These lasers create a three-dimensional representation of a scene that can be revisited at later points. The increased speed and precision of 3D-capture technology is projected to save Dane County \$18,100 per year (Chinavare 2017). Currently, the Ponto laboratory and the sheriff's department are evaluating the accuracy and validity of 3D-capture technology, identifying flaws and areas for improvement. WiSAKI and scientific collaborations in Dane County demonstrate that (1) funding is available to address issues facing forensic sciences, and (2) successful scientific collaborations benefit citizens and our government. In the interest of justice, such pursuits should be applied more broadly to establish procedures, policies, and practices to improve forensic analysis quality.

To identify and remedy problems within the Wisconsin criminal justice system, the State Bar of Wisconsin, Marquette University Law School, the Wisconsin Attorney General's Office, and the University of Wisconsin-Madison Law School established the Wisconsin Criminal Justice Study Commission (2005–2008). The commission reviewed topics including expert testimony, junk science, prosecutorial discretion, confirmation bias in criminal investigations, crime lab standards and funding, defense attorney training and funding, appellate standards of review, and the DNA backlog in Wisconsin state crime laboratories (Wisconsin Criminal Justice Study Commission 2007). After expert testimony and discussions, in 2007 the commission released recommendations for Wisconsin's DNA backlogs; yet the validity of forensic techniques was not addressed (Wisconsin Criminal Justice Study Commission 2007). The suggested recommendations led to no legislative

action, and issues regarding the accuracy of forensic science remain unmanaged.

Legislative reform measures would benefit Wisconsin citizens by ensuring long-term ethical and fiscal responsibility. Starting in 2013, Texas legislation streamlined the process of post-conviction testing, making it easier to challenge convictions based on new DNA or other evidence (Chammah 2015). Previously, only seven DNA exonerations had occurred, while 37 have followed after the reform (National Association for Public Defense 2018). Moreover, the Texas Forensic Science Commission (TFSC) observed that since 2010, the number of exonerations for drug-related crimes increased 98% over six years and that 94% of these cases involved false or misleading forensic evidence. The TFSC learned that previously, evidence from drug kits collected in the field was considered low-priority and therefore delayed in analysis, leading to eventual plea bargains for detained suspects. Pleas by the accused further lowered the priority of kit testing, sometimes delaying results until after sentences had already been served. The investigative efforts of the TFSC revealed not only flaws in forensic reliability and training but also in criminal justice procedures (Timothy Cole Exoneration Review Commission 2011). Such reforms made based off of the TFSC's recommendations have led to more opportunities to correct injustice resulting from improper forensic science. Additionally, the TFSC's involvement in the criminal justice system has helped save the Texas corrections system time and money.

#### **IV. Aims for a Wisconsin forensic science commission**

Some states have made significant progress in legislative reform concerning forensic science. Formed in 2005, the TFSC is considered the most comprehensive oversight body for forensic laboratories (Goldstein 2011). Mimicking the TFSC structure, a Wisconsin commission should comprise representatives from stakeholding communities, including prosecuting and defense attorneys, representatives appointed by the governor, and scientists from relevant fields. The commission's purpose should be to ensure the quality of forensic science in Wisconsin through the following state directives:

- Investigate complaints

- Perform educational inquiries and initiatives, and
- Certify labs and validate techniques.

### *Investigate complaints*

Although most state forensic laboratories are now accredited, accreditation is not an unequivocal protection against mishaps. Potential forensic science misconduct or other issues within a crime laboratory can be self-reported by the lab, whistleblowers, or outside groups. The commission, in conjunction with other government entities and stakeholders, could conduct independent reviews. Once investigations are concluded, the commission could make comprehensive recommendations to remedy any deficiencies. This unbiased approach differs from an internal investigation, allowing more independence and transparency by releasing findings to the public (Texas Forensic Science Commission 2017). The TFSC implemented such measures for investigating and correcting faulty forensic science methods, like those used in DNA mixture evidence (Goldstein 2011, Texas District & County Attorneys Association 2018). Although it is not clear how many local cases were impacted by misinterpretations of mixture DNA, the TFSC has reviewed more than 1550 cases for errors (Texas Judicial Branch 2018) and has collaborated with expert scientists to create a protocol on limitations and recommendations for mixture DNA interpretation (Bieber et al. 2016). Additionally, Texas and other states have initiated reviews of microscopic hair and fiber analysis cases, prompted by the FBI's acknowledgment of flaws in analysis procedures (Hsu 2015). This investigation represents the largest post-conviction review of forensic science techniques conducted to date. Wisconsin has no plans or means for conducting such reviews (Proctor 2017).

The TSFC also has a Complaint Screening Committee, which meets twice annually to present its findings on complaints filed (Stride 2011). The public can attend and comment on the findings. Panels for active investigations are published, along with reasoning for case dismissals and recommendations for improvements in final case reports (Texas Forensic Science Commission Nov. 2017), ensuring swift response to complaints and promoting

transparency. The structure and practices of the TFSC are readily available, making the creation of a similar commission for Wisconsin realistically feasible.

### *Perform educational inquiries and initiatives*

A forensic science commission could promote the proficiency of crime laboratories within the criminal justice community. Performing inquiries into forensic methodology for educational purposes, not solely based on complaints, can improve validation of existing forensic techniques, expedite implementation of new methods, and stimulate collaboration between law enforcement and scientists (Wisconsin Sexual Assault Kit Initiative 2018, Rivedal 2017, Thornton 2016). Examples of topics to include on the educational agenda are ethics, quality assurance, the accreditation process, the certification of analysts, tours of facilities, and current or possible future issues in forensic science. Forensic and other academic scientists will be familiar with many of these subjects and may serve as instructors for the committee. Since Wisconsin courts can determine relevance and validity of expert testimony (Aprahamian 2017, Saks and Koehler 2005), other educational initiatives developed with scientists could focus on informing lawyers and judges, playing a positive role in improving the understanding of key forensic issues.

### *Certify labs and validate techniques*

Wisconsin's criminal laboratories are accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB). However, accreditation does not address the soundness of science, identify fraud or error, or advocate for better practices (Saks and Koehler 2005). Building on requirements for national accreditation, a commission could create unifying practices and protocols and identify imbalances in current practices. For example, scientists from the National Institute of Standards and Technology (NIST) expressed concern that while technology and techniques used in laboratory settings have progressed, the evaluation and interpretation of these results have not improved at the same rate, leading to misinterpretations (Coble and Butler 2010, Coble and Butler 2015). This concern was highlighted in 2013, when NIST conducted a review of DNA mixture techniques

using 108 forensic labs to evaluate a three-person mixture sample (Coble and Butler 2010, Coble and Butler 2015). The conclusions varied widely, a finding that NIST attributed to flaws in analysis (Coble and Butler 2010, Coble and Butler 2015). A Wisconsin Forensic Science Commission has the potential to independently validate techniques by gathering a group of scientific experts in DNA analysis to construct a protocol detailing appropriate ways to evaluate DNA mixture evidence.

A commission can also address ways to prevent human bias from contaminating results, an issue not currently addressed in audits performed by the ASCLD/LAB (Kassin, Dror, and Kukucka 2013). The TFSC has addressed these concerns by hiring scientific advisors and sharing findings in open-access journals and advisory workshops. In 2017, a senior scientific advisor position was added to the TFSC to assist the commission and its staff in the procedural aspects of examinations, accreditation, and licensing programs (Texas Forensic Science Commission 2018). And, in 2015, the TFSC shared their interdisciplinary science review panel structure, which was approved by the International Association for Arson Investigators (IAAI), a professional association of fire investigators (International Association of Arson Investigators

2015). The added transparency of posting policies, publications, and laboratory documents boosts public confidence and trust in the criminal justice system.

#### IV. Conclusion

States are in an excellent position to impact the quality of forensic science since the majority of crime laboratory services are provided by state and local laboratories (Burch et al. 2014). A commission of individuals with diverse perspectives and technical expertise will ensure that Wisconsin has access to high-quality forensic science. Delegating issues of aforementioned societal costs to a centralized commission will allow more opportunities for solutions and preventative measures. Both national and state funding is available through grants to help support such endeavors, and current collaborations have proven to be successful. By establishing a commission, Wisconsin could become a leader in quality forensic science, improve safety and justice, and set an example for the rest of the nation to follow.

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