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## Bloodstain Pattern Analysis, The Good, The Bad, and The Ugly

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Expert testimony in trial courts across the United States is governed by the Federal Rules of Evidence and the trial judges themselves. The trial judges, along with the rules, get to make the ultimate call on whether expert testimony will be permitted or excluded from a civil or criminal trial. Expert testimony can become the one thing that tips the scale in any case. In a criminal case for homicide or murder, it can be the difference between freedom and a lifelong prison sentence or death. What happens when the expert is testifying about a controversial topic? To some, at first thought, blood spatter evidence may seem reliable. In some respects, it can be helpful to determine things like if the person was present at the location. Testifying experts have used it for more than that, they have testified that they could tell the location of the altercation and who had to have done it after analyzing the blood spatter. This paper examines the issue(s) with classifying an expert in blood spatter and permitting them to testify at trial about certain things. Specifically, the paper looks to the evidentiary issues that Blood Spatter Experts should and should not be able to speak to and how the Federal Rules of Evidence as a whole sometimes fail to keep evidence that is inadmissible out.

## **I. The Birthplace of Blood Spatter**

Several hours north of New York City in an upstate town called Corning, New York, blood spatter analysis was born.<sup>1</sup> Herbert MacDonnell spent countless hours in his basement laboratory from while pursuing a degree in analytical chemistry.<sup>2</sup> MacDonell created his basement “laboratory” to work on his craft. MacDonell first testified for a defendant in a New York murder trial that the defendant’s story was true and that the gun was set off accidentally.<sup>3</sup> A

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<sup>1</sup> Pro Publica, Features, How a Dubious Forensic Science Spread Like a Virus, <https://features.propublica.org/blood-spatter-analysis/herbert-macdonell-forensic-evidence-judges-and-courts/> (Last Visited Dec. 13, 2018)

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

year later Macdonell applied for a Department of Justice grant to continue his blood stain studies.<sup>4</sup> The Department of Justice published his findings in a report titled “Flight Characteristics and Stain Patterns of Human Blood”.<sup>5</sup> It was then considered the founding text in modern American blood-pattern analysis.<sup>6</sup> In his own report MacDonnell stated that the accuracies of his findings could not be measured.<sup>7</sup> MacDonnell also branded his unaccredited basement laboratory as “The Laboratory of Forensic Science” and referred to himself as the director.<sup>8</sup> In 1973 MacDonnell was invited to the Mississippi Department of Justice funded office and taught the officers in various police departments how to analyze bloodstain patterns.<sup>9</sup> MacDonnell continued to teach law enforcement officers across the country and by 1982 taught at nineteen institutes across the United States.<sup>10</sup>

MacDonnell would hand out exams and recalled that only five students failed in thirty five years of administering the bloodstain pattern analysis exam he created.<sup>11</sup> MacDonnell was called to testify in various high profile cases such as Jean Harris and O.J. Simpson.<sup>12</sup> In five states, the earliest mention of bloodstain analysis mention MacDonnell’s reports and expert testimony.<sup>13</sup> Macdonnell’s work was even recognized by a judge to be based on general principles of science, physics and mathematics.<sup>14</sup> Throughout the years, a large amount of blood spatter experts, often trained by MacDonnell were dazzling juries across the entire United States.<sup>15</sup>

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<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

These experts, with their testimony, linked circumstantial evidence.<sup>16</sup> MacDonell may have experience and a degree in analytical chemistry, but what permits this newly discovered “science” to get be used in court where people’s life and liberty are in danger?

## II. Judges as Gate Keepers

In the United States federal system, the Federal Rules of Evidence provide guidance on what is admissible in a criminal or civil trial. The admission of expert witness testimony in Federal Court is governed by Rule 702.<sup>17</sup> The original controlling case in regard to expert testimony was *Fry v. United States*.<sup>18</sup> The standard set forth in Fry, was that a specific expertise or type of skill could be recognized as a valid in the expert’s field.<sup>19</sup> After Fry, the Supreme Court declared that the trial judge would act as the gate keeper.<sup>20</sup> Daubert set fourth that the gate keeping roll would determine the scientific validity of expert testimony, and outlined several factors such as if it can be tested, if the theory or technique is subject to peer review, and the known or potential rate of error.<sup>21</sup> The first factor in Daubert is the most important, whether it can be tested.<sup>22</sup> After *Daubert*, the Court held in *Kumho Tire Co v. Carmichael* that a judge’s gatekeeping ability does apply to all expert testimony and that Daubert type questions can be asked even if the expert isn’t testifying on a scientific subject.<sup>23</sup>

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<sup>16</sup>*Id.*

<sup>17</sup> Fed. R. Evid. 702:

A Witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert’s scientific, technical, or otherwise specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts

<sup>18</sup> Frye, *Supra* at 1014 “When a scientific principle or discovery crosses the line between experimental and demonstrable stages is difficult to define...thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field where it belongs”

<sup>19</sup> *Id.*

<sup>20</sup> *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S.Ct. 2786 (1993).

<sup>21</sup> *Id.* at 2790

<sup>22</sup> *Id.* at 2790

<sup>23</sup> *Kumho Tire Co v. Carmichael*, 526 U.S. 137, 151 (1999).

## A. Testimony by Expert Witnesses

Federal Rule of Evidence 702 governs testimony by an expert witness.<sup>24</sup> The Advisory Committee Notes on the proposed rules outline that it is difficult and sometimes near impossible to evaluate facts without some sort of specialized or scientific knowledge.<sup>25</sup> The Advisory Committee Notes also recognize that experts testify on more than simply their opinions.<sup>26</sup> The trier of fact is the one to determine the use of the expert testimony.<sup>27</sup> The expert is viewed as a person qualified by “knowledge, skill, experience, training or education”.<sup>28</sup>

The Committee notes on Rules recognized that Daubert, did not attempt to codify the specific factors and the factors set forth in Daubert are not exclusive.<sup>29</sup> Daubert specifically gave trial judges the power to exclude unreliable expert testimony.<sup>30</sup> Kumho went on to clarify that the gatekeeper function outlined in Daubert applies to all expert testimony, not just testimony that is based on science.<sup>31</sup> The amended rule is consistent with Kumho and affirms that the trial court must use it to assess the helpfulness with the expert testimony.<sup>32</sup> The very purpose of Rule 702 is to allow District courts to perform critical “gatekeeping”.<sup>33</sup> *United States v. Barton*, a criminal proceeding, examined abuse of discretion in finding that a DNA expert’s testimony be reliable.<sup>34</sup> The court applied the analysis set forth in Kumho Tire to reach their conclusion.<sup>35</sup> The court also acknowledged the purpose of Daubert, outlining that expert testimony can be highly important

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<sup>24</sup> Fed. R. Evid. 702

<sup>25</sup> Fed. R. Evid 702, Advisory Committee on Proposed Rules (Dec 1, 2011)

<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> Fed R. Evid. 702, Committee Notes on Rules- 2000 Amendment

<sup>30</sup> *Id.*

<sup>31</sup> Kumho, 119 S.Ct. at 1179.

<sup>32</sup> Fed. R. Evid. 702, Committee Notes on Rules- 2000 Amendment

<sup>33</sup> *Id.*

<sup>34</sup> *United States v. Barton*, 909 F.3d 1323 (11 Cir. 2018).

<sup>35</sup> *Kumho*, 119 S.Ct. (1999)

and persuasive but can also be difficult for a lay jury to evaluate.<sup>36</sup> The core issue in *Barton* was reliability.<sup>37</sup> In *Barton*, the court looked to the illustrative factors set forth in *Daubert*.<sup>38</sup> To determine reliability, *Barton* outlined that the list of factors was not exhaustive and included the following, “(1) whether the expert’s theory can be and has been tested; (2) whether the theory has been subjected to peer review and publication; (3) the known or potential rate of error of the particular scientific technique; and (4) whether the technique is generally accepted in the scientific community.”<sup>39</sup> Importantly, the *Barton* court highlighted that the judge is to act as a gatekeeper but also cannot be a substitute for the judgment of the jury.<sup>40</sup> When dealing with “shaky” but admissible evidence, the court in *Quiet Tech* outlined that vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the appropriate and traditional means of attacking the evidence.<sup>41</sup> The court in *Barton* concluded that the arguments were based not upon admissibility but ultimately upon weight.<sup>42</sup>

### **B. The Weight of the Experts Testimony, Rule 104, Rule 401, and Rule 403**

Federal Rule of Evidence Rule 104 permits the court to decide relevance of the evidence presented. Rule 104(b) outlines that “when relevance of evidence depends on fact that exists, proof must be introduced sufficient to support a finding that the fact does exist. The court may admit the proposed evidence on the condition that the proof be introduced later.”<sup>43</sup> The Advisory Committee Notes caution that if the questions of conditional relevancy were only considered by the judge the function of the jury as the trier of fact would be greatly restricted and

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<sup>36</sup> *United States v. Barton*, 909 F.3d 1323, 1331 (11th Cir. 2018)

<sup>37</sup> *Id.*

<sup>38</sup> *Id.*

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *Id.* (quoting *Daubert*, S.Ct. 2786)

<sup>42</sup> *Id.*

<sup>43</sup> Fed. R. Evid. 104

in some cases destroyed.<sup>44</sup> The Federal Rules do not define the standard of proof that the court must observe in answering these types of questions.<sup>45</sup> The court in *Bourjaily* outlined that the interpretation of evidence is not if the proponent of the evidence wins or loses his case on the merits but whether the evidence meets the evidentiary standard set by the Rules.<sup>46</sup> In a criminal case the evidentiary standard is unrelated to the burden of proof.<sup>47</sup> Rule 104 can act as another gatekeeper for evidence that expert witnesses would like to proffer or draw conclusions from.

Federal Rules of Evidence 401 states that evidence is relevant if: (a) it has any tendency to make a fact more or less probable than it would without the evidence; and (b) the fact is the consequence in determining the action.<sup>48</sup> The trial court has broad discretion in determining the relevance of the proposed evidence.<sup>49</sup> The Advisory Committee Notes also discuss the “conditional relevancy” issue, where probative value depends on not just satisfying the basic relevancy requirement but also the existence of some matter of fact.<sup>50</sup> The rule itself also enables counsel to be creative in order argue for evidence being admissible. Federal Rule 403 can also act as a gatekeeper in conjunction with Rule 701, and it is important to consider in a proceeding that these rules often work as moving parts to a larger machine.

There is another way under the Federal Rules of Evidence to keep relevant evidence out of court. Rule 403 carves out when the court may exclude relevant evidence. Rule 403 provides that the court may exclude relevant evidence if its probative value is substantially outweighed by its danger of one or more of the following; unfair prejudice, confusing the issues, misleading the

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<sup>44</sup> *Id.* at Advisory Committee Note (Dec 1, 2011).

<sup>45</sup> *Bourjaily v. United States*, 107 S. Ct. 2775, 2778 (1987).

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at 2779, see generally *Colorado v. Conelly*, 107 S.Ct. 515,522-23 (1986)

<sup>48</sup> Fed. R. Evid. 401

<sup>49</sup> *Id.* see also, 18 U.S.C.A. § 1341

<sup>50</sup> Fed. R. Evid. 401 Advisory Committee Note (Dec 1, 2011)

jury.<sup>51</sup> The notes of the Advisory Committee outline that in some circumstances evidence should be excluded on a purely emotional basis, or on the other extreme, wasting time.<sup>52</sup> The notes caution that when reaching a decision on whether to exclude evidence on grounds of unfair prejudice consideration should be given to the probable lack of effectiveness or effectiveness of a limiting instruction.<sup>53</sup>

### **III. Blood Spatter Analysis, as Accurate as a Ouija Board**

Julie Rea tucked her son Joel in for bed, and till this day wishes that she held him longer.<sup>54</sup> In the morning of Oct. 13, 1997, Julie Rea was awaked by a scream and learned there was an intruder in her home.<sup>55</sup> She saw no sign of her son and told the police that she struggled with the man who had fled her home, then she ran for help.<sup>56</sup> She learned it was too late, and her 10 year old son, Joel Kirkpatrick, had been stabbed to death.<sup>57</sup> Rea herself was covered in bruises, rug burns, she had a black eye and he right arm required stitches.<sup>58</sup> At the time of the murder, Rea was a single mother working towards her doctorate in educational psychology.<sup>59</sup> A mild-mannered woman focusing on raising her son, Rea was hardly the type to murder him.<sup>60</sup> In 2000, after a drawn out and deeply flawed investigation, Rea was charged with murdering her

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<sup>51</sup> Fed. R. Evid. 403

<sup>52</sup> *Id.* at Advisory Committee Notes (Dec 1, 2011)

<sup>53</sup> *Id.*

<sup>54</sup> New York Times Magazine, “She Was Exonerated of the Murder of her Son. Her Life is Still Shattered.” <https://www.nytimes.com/2018/12/20/magazine/she-was-exonerated-of-the-murder-of-her-son-her-life-is-still-shattered.html> (last visited Dec. 20, 2018)

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> Pro Publica, Bloodstain Analysis Convinced a Jury She Stabbed her 10-Year old Son.

<https://www.propublica.org/article/bloodstain-pattern-analysis-jury-wrongful-conviction-acquitted-exonerated> (Last Visited Dec. 10, 2018)

<sup>59</sup> She was Exonerated for the Murder of her Son. Her life is Still Shattered.

<https://www.nytimes.com/2018/12/20/magazine/she-was-exonerated-of-the-murder-of-her-son-her-life-is-still-shattered.html> (last visited Dec. 20, 2018)

<sup>60</sup> She was Exonerated for the Murder of her Son. Her life is Still Shattered.

<https://www.nytimes.com/2018/12/20/magazine/she-was-exonerated-of-the-murder-of-her-son-her-life-is-still-shattered.html> (last visited Dec. 20, 2018)



son.<sup>61</sup> Rea now 50, told the NY Times, surviving your child's murder only to find out you are being accused of murdering your child is a trauma she wouldn't wish on any living being.<sup>62</sup> The prosecutors hung their hats on a forensic discipline called bloodstain pattern analysis. They argued that an intruder never entered her home the night of the crime and that Rea was her son's killer.<sup>63</sup> The prosecution relied on the testimony of two bloodstain-pattern analyst experts.

Four years later, Rea was acquitted at a retrial, after a legal team assembled by Northwestern University's Pritzker Law School of Chicago.<sup>64</sup> The legal team presented a vigorous defense that challenged the expert testimony and presented new evidence that a serial killer who was on death row in Texas was responsible for her son's murder.<sup>65</sup> A year prior to Rea's exoneration, the National Academy of Sciences had released a report that doubted the reliability of bloodstain-pattern analysis.<sup>66</sup> The report stated that blood-pattern analysis and its practitioners conclusions were more often than not subjective not scientific.<sup>67</sup> The report outlines the issues with experts in general, that experts draw conclusions far beyond what can be supported by the evidence.<sup>68</sup> The report criticized various forensic disciplines including hairs, fibers, bitemarks, and shoe and tire impressions.<sup>69</sup> The report even grappled with the issues that *Daubert* aimed to eliminate, whether and to what extent a forensic discipline is science.<sup>70</sup> The report called for large scale reform, but Rea was still convicted and over a decade later from its publishing, little has changed.

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<sup>61</sup> *Id.*

<sup>62</sup> *Id.*

<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Id.* See also: Strengthening Forensic Science in the United States: A Path Forward. <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf> (2009).

<sup>67</sup> *Id.*

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

The prosecution and their experts focused on the remnants of blood Rea may have attempted to wash away, they dug up her septic tank, shower drains, doused her clothes in Luminol and found nothing.<sup>71</sup> They also could not find any discernable motive.<sup>72</sup> This is where the prosecution’s two experts came in. The prosecution hired expert Rodney Englert, who examined the nightshirt of Rea.<sup>73</sup> Englert testified that he interpreted a cast-off pattern on her nightshirt.<sup>74</sup> Englert’s website boasts that he is a retired Chief Deputy and veteran of law enforcement in Portland Oregon.<sup>75</sup> On his website, which reads like an interactive resume, Englert boasts he has testified in homicide cases in 26 states and has conducted over 600 lectures on blood spatter interpretation.<sup>76</sup> Englert also lists himself as being chairman or president of various forensic associations.<sup>77</sup> Englert claims to be able to correctly interpret “complex clues” to be found in blood at “violent” crime scenes.<sup>78</sup> Englert even has a downloadable chart that claims to help analyze bloodstain pattern analysis, with images and examples of a hand swipe, hair impact, and medium velocity splatter.<sup>79</sup> Judy Roy, a staff attorney with the Center of Wrongful Convictions who began working on Rea’s case in 2003, stated “an expert who says, “this physical evidence shows..” is extremely persuasive especially in a circumstantial case”. Roy acknowledging that experts can sway cases when there is little evidence highlights the conversation that attorneys and judges alike should be having. Roy went onto say that Jurors don’t understand when an expert is overstating facts beyond what can be tested and replicated.<sup>80</sup>

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<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> Darlie Router, Investigating Innocence; <https://investigatinginnocence.org/darlie-routier> (last visited Jan. 2020)

<sup>74</sup> *Id.*

<sup>75</sup> Englert Forensics, <https://englertforensics.com/bio/>

<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> Pro Publica, Bloodstain Analysis Convinced a Jury She Stabbed her 10-Year old Son.

<https://www.propublica.org/article/bloodstain-pattern-analysis-jury-wrongful-conviction-acquitted-exonerated>

The very issue is that jurors are not able to know when an expert is overstating, unless opposing counsel diligently breaks down what the science is claiming to do and argues what it cannot. The second expert used by the prosecution was named Dexter Barlett, he had the task of interpreting the bloodstain on Rea's T-Shirt. His expert opinion was based on his "experience of going to too many scenes like this, hundred of scenes".<sup>81</sup> The defense called Paul Kish, who testified that his microscopic examination of the T-shirt led him to believe Joel's blood has transferred to it.<sup>82</sup>

David Camm, a Indiana state trooper who found his wife and two children shot in their home in 2000, was quickly charged with their murders.<sup>83</sup> The prosecution presented a succession of bloodstain-pattern analysts who testified that eight specks of blood found on the T-shirt that David Camm was wearing the night of the crime were "high velocity impact spatter" from shooting.<sup>84</sup> The prosecution called Robert Stites, a blood spatter analysts from Portland, Oregon to testify. Stites testified that the eight tiny blood stains came from the spray made by the bullet fired into his daughter's head.<sup>85</sup>

The defense also produced its own bloodstain experts who argued that the eight droplets in question were actually "transfer stains", meaning the blood blotted Camm's T-shirt as he attempted to aid his family.<sup>86</sup> The defense called Robert Shaler, a retired biochemist and forensic scientist to testify.<sup>87</sup> Shaler testified that the experts in both sides were incorrect, he argued the specks of blood was too little information to draw any meaningful conclusion. Shaler was one of

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<sup>81</sup> *Id.*

<sup>82</sup> *Id.*

<sup>83</sup> Pro Publica, Bloodstain Analysis Convinced a Jury She Stabbed her 10-Year old Son.

<https://www.propublica.org/article/bloodstain-pattern-analysis-jury-wrongful-conviction-acquitted-exonerated>

(Last Visited Dec. 10, 2018)

<sup>84</sup> *Id.*

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

<sup>87</sup> *Id.*

the authors of the National Academy of Sciences report and the founding director of Penn State University's Forensic Science Program.<sup>88</sup> Shaler went on to say the experts could not even agree on what type of pattern they were looking at.<sup>89</sup> Shaler style of testifying for the defense, seems to be the only tactic in keeping expert witnesses from reaching too far and tying circumstantial evidence in neat bows for jurors. Camm's lead attorney at his third trial went on to say " People see what they want to see. It is as accurate as an ouja board" when asked about bloodstain pattern analysis.<sup>90</sup>

The Rea and Camm case both hinged on minute amounts of blood stained evidence. Rea and Camm were both painted as killers by the prosecution. Rea was convicted because of a small amount of blood on her nightshirt, even though she scuffled with the intruder and had various injuries herself. Camm was convicted because of 8 droplets of blood, that the prosecution claimed was caused by him shooting his daughter in the back of the head. Both Rea and Camm were ultimately acquitted, both after serving time and facing community backlash and losing their careers and ultimately their family.

#### **IV. The Limits on Bloodstain Pattern Analysis**

In both Julie Rea's case and David Camm's case, there is no doubt that bloodstain pattern experts could have had some beneficial impact in the trials. Bloodstain pattern analysis can help inform juries of things important to the cases such as, who was at the scene. By blood simply being at the scene, and identifying who's blood is present through DNA, that can help link victims and suspects alike for jurors. There is no doubt that forensic evidence can tell us things, for example if there are bloody handprints smeared all over the wall, we know there could be a

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<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Id.*

struggle or someone trying to escape. The issue with Bloodstain Pattern expert's testifying all together, the issue is where to draw the line. When *Daubert* and *Kumho Tire* and the Federal Rules of Evidence fail people like Julie Rea and David Camm, we must take a step back and look at the "forensic science" of bloodstain pattern analysis itself.

An expert as defined by Rule 702, the qualifications to be considered an expert witness are broad.<sup>91</sup> Bloodstain Pattern Analysis has been widely used in court and seems to be categorized under 702(a) and 702(c).<sup>92</sup> Is Bloodstain pattern analysis really science? Is the testimony based off of reliable principles and methods? After hearing of Julie Rea and David Camm's case, it is clear that a Bloodstain pattern analyst should only be able to testify on certain topics. Bloodstain pattern analysts should not be able to testify on whether someone has committed a crime based on eight droplets of blood, further, "transfer" bloodstain seems to be out of the bounds of what the bloodstain pattern analyst can quantify. Experts like Dexter Barlett, in the Rea case, offered no data or explanation for his conclusion that Rea was wielding the knife that killed her son.<sup>93</sup> Limiting an expert from testifying upon certain things and drawing certain conclusions, requires careful and tactical planning on the part of the attorney.

Many experts have resumes a mile long. These resumes often boast various associations that they are members of or even "president" of. To a lay juror, these associations may sound credible. Mr. Robert Englert, the prosecution expert in the Julie Rea case, boasted a long list of associations on his resume as well. Englert lists himself as a member of the "Homicide Investigator's Associations Fellow, Distinguished Member, President (2001/2002).<sup>94</sup> Englert also

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<sup>91</sup> Fed. R. Evid. 702.

<sup>92</sup> *Id.*

<sup>93</sup> Pro Publica, Bloodstain Analysis Convinced A Jury She Killed her 10 Year-Old Son.

<https://www.propublica.org/article/bloodstain-pattern-analysis-jury-wrongful-conviction-acquitted-exonerated>

<sup>94</sup> Robert Englert Forensics, <https://englertforensics.com/bio/>

lists himself as a fellow in the American Academy of Forensic Sciences, and a Past- President of the International Association of Blood Pattern Analysts.<sup>95</sup> To a lay juror, this might sound like a long list of credentials, but it should be taken with a grain of salt. After taking a deeper dive into the American Academy of Forensic Sciences, it appears to be a multi-disciplinary professional organization that focuses on improved research and practice of the forensic sciences.<sup>96</sup> The organization lists its past presidents, which includes a long list of people who obtain Juris Doctorates, Doctorates, M.D's and Bachelor's Degrees. The association seems to publish journals on forensics and other topics using this association. Englert lists another association he is a member of, The Association of Crime Reconstruction.<sup>97</sup> Upon finding the Association of Crime Reconstruction's barebones website, membership is based on being "actively" involved in the field of crime scene reconstruction.<sup>98</sup> The person applying for membership also must get two recommendations from ACSR voting members.<sup>99</sup> This makes it very much a closed circle, the organization itself seems to only let certain people in, that know other voting members of the association. There are also provisional members and supporting members which must pay dues but cannot actively vote.<sup>100</sup>

One association that a lot of Blood Spatter Pattern Analysts have in common on their resume is The International Association of Bloodstain Pattern Analysts, "IABPA".<sup>101</sup> In it's biography, the organization states its main objective as "encouraging and promoting the science of Bloodstain Pattern Analysis".<sup>102</sup> The IABPA also states that it currently has a worldwide

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<sup>95</sup> *Id.*

<sup>96</sup> National Academy of Forensic Sciences, <https://www.aafs.org/>

<sup>97</sup> The Association of Crime Reconstruction, <https://www.acsr.org/>

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> *Id.*

<sup>101</sup> The International Association of Bloodstain Pattern Analysts, <https://www.iabpa.org/home>

<sup>102</sup> *Id.*

membership from various scientific and law enforcement backgrounds. The IABPA offers conferences and training as well as resources from current studies produced by Bloodstain pattern Analysts experts.<sup>103</sup> The IABPA education committee lists its own instructors who have been “reviewed” by the committee itself and are deemed to be recommended, but these courses are only provided to people who are members of the committee and to the forensic science and law enforcement communities.<sup>104</sup> To obtain membership to this organization, one must complete the IABPA approved 40 hour basic course of Bloodstain Pattern Analysis, or be recommended by a current full member in good standing.<sup>105</sup> The organization seems to make people jump through a lot of “hoops” to become members, but the requirements are vague, the biggest issue with becoming a member seems to be the 40 hour course and the membership dues.<sup>106</sup>

The grandiose list of associations an expert belongs to is a great way to impress a jury full of lay persons, into thinking that this expert can actually do what they are claiming to do. In the instance of Julie Rea and David Camm, their liberty hung in the balance as these experts were able to boast credentials that would give them more credibility. Some of the organizations listed above may in fact be credible, but the large amount of organizations, seem to be a “boys club” filled with Bloodstain Pattern Analysis experts, that all want the same goal, to get paid. For the International Association of Bloodstain Pattern Analysts, in order to become a member, you have to have taken a 40-hour basic course offered by the institution, and even then to become a member with voting rights you have to be sponsored by another member.<sup>107</sup> These types of provisions and regulations within an institution set up a vicious cycle. The cycle where members

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<sup>103</sup> *Id.*

<sup>104</sup> *Id.*

<sup>105</sup> *Id.*

<sup>106</sup> *Id.*

<sup>107</sup> *Id.*

must be approved by other members, which likely means that these members see eye to eye with each other. For example, one bloodstain pattern analysis expert likely has the same views and morals as the individual that they are attempting to vote into the association. This cycle promotes experts, becoming seemingly more “credible” because their association membership, to only let other experts in with similar views, leading to hundreds of experts, certified by the same body that are willing to do or say anything in court, even past the boundaries of what their forensic science enables them to conclude.

The National Academy of Sciences in 2009 released a report that criticized bloodstain pattern analysis as being more subjective than science.<sup>108</sup> This organization has been one of the few to challenge forensic science as a whole, let alone bloodstain pattern analysis. The report outlines that forensic laboratories are understaffed and under sourced.<sup>109</sup> The report analyzed that the issue of being understaffed and under sourced also causes the laboratories to have case backlogs and makes it difficult for the laboratories to provide strong evidence for prosecutions and contributes to errors that could lead to imperfect justice.<sup>110</sup> The crux of the report is that the academy highlights that the forensic system only has thin ties to academic based research that could support the forensic disciplines and fill the knowledge gaps.<sup>111</sup>

The report focuses on this gap and that the forensic science itself is hindered by its disaggregation from multiple practitioners coming from various levels of education and discipline as well as different professional cultures.<sup>112</sup> The report also takes a closer look at the professional associations, similar to those that I discussed above. The report calls for a more

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<sup>108</sup> Strengthening Forensic Science in the United States: A Path Forward, <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf>

<sup>109</sup> *Id.*

<sup>110</sup> *Id.*

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*



consistent and monetized requirement, and notes that the largest organizations are not clear on their standards and policies.<sup>113</sup> The report calls the need for one dominant association, similar to the main federal resources such as the FBI Laboratory and the National Institute of Justice “NIJ”.<sup>114</sup> The report suggests that the forensic enterprise needs a strong governance to promote an aggressive long term agenda to help strengthen the forensic disciplines.<sup>115</sup> The governance must be strong and independent in order to identify the limitations of the forensic science methodologies.<sup>116</sup> The report suggests that the governance entity be geared toward the law enforcement community and have strengths beyond that area.<sup>117</sup> The report suggests that a new federal agency be established and listed several minimum criteria for the new agency. One, that is strongly rooted in science with ties to national research, that it must have strong ties to both state and local forensic entities, it must not be a part of a law enforcement agency, and that it must have the independence to raise the profile of forensic science disciplines.<sup>118</sup>

This report is very telling, it acknowledges that on a national level the forensic sciences are not looked at in a strong light, yet they are still used in trial after trial across this country’s judicial system. The report makes strong recommendations and highlights the issues with various professional associations that are all attempting to do achieve the same goal but failing. The report also acknowledges the growing pressures on the forensic system itself. The report does not entirely discredit forensic sciences, it simply calls for a more unified governing body and to tighten the gap of forensic science.

#### **A. What Can Bloodstain Pattern Analysis Tell Us?**

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<sup>113</sup> *Id.*

<sup>114</sup> *Id.*

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

Daniel Attinger, a mechanical engineer at Iowa State University, explains that some early methods that blood spatter analysts have used did not consider the intricacies of how blood moves and deforms after leaving a body.<sup>119</sup> Attinger acknowledged that in the early days, researchers would walk into a room, fill a sponge with blood and hit it to get their data.<sup>120</sup> The rift in knowledge is where the fluid dynamics comes in. Attinger and his fellow researchers' new models can now demonstrate mathematical relations between the shape and speed of a bullet and the distribution of the resulting blood spatter.<sup>121</sup> The team now says that they have a "pretty generalized model" and that they can say more or less when they have this number of droplets, with this bullet at this velocity, that the shooter was in a certain location.<sup>122</sup>

The team shared that one of the most important factors is being able to predict how blood breaks into smaller drops in a process called atomization.<sup>123</sup> Attinger and his team explain that blood spatter progresses in two directions- backward, toward the shooter, and forward, parallel to the path of the bullet.<sup>124</sup> Attinger explains that backwards is the easier of the two because no matter what way the bullet is hitting it will create a recoil.<sup>125</sup> The researchers hope that their models will someday be sophisticated enough to be translated into a chart that spatter analysts can use in the field.<sup>126</sup>

Marilyn Miller, a forensic expert at Virginia Commonwealth University says that possibility is a long way off.<sup>127</sup> Miller acknowledges that perfect research conditions

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<sup>119</sup> There will be blood, and physics, too: The messy science of bloodstain pattern analysts.

<https://www.pbs.org/wgbh/nova/article/forensics-bloodstain-pattern-analysis/>

<sup>120</sup> *Id.*

<sup>121</sup> *Id.*

<sup>122</sup> *Id.*

<sup>123</sup> *Id.*

<sup>124</sup> *Id.*

<sup>125</sup> *Id.*

<sup>126</sup> *Id.*

<sup>127</sup> *Id.*

manufactured in a lab are vastly different from the highly textured world of a crime scene.<sup>128</sup>

Miller does acknowledge that this type of fundamental research should be the base of all forensic science.<sup>129</sup>

Miller suggests that the model might be able to help with hypothesis of how things occurred at a crime scene, allowing the argument of “evidence might suggest that a blow was struck *here*, using *this*”.<sup>130</sup> The scientific gap in these types of disciplines is about communication, not the willful ignorance, argues Suzanne Bell, a forensic expert at West Virginia University.<sup>131</sup> Bell also blamed a resource issue, with forensic labs being overrun with cases, there is not enough time to digest and research.<sup>132</sup>

These researchers hope their models can be used, someday, in real cases. Miller acknowledged that possibility is a way away. Sure, these methods can be proven, and the researches may have it down to a science, but again, the likelihood that a crime scene looks similar to a pristine research lab is slim to none. The problem with creating and reconstructing scenes is very much the fact that they are created. The Organization of Scientific Area Committees For Forensics Science, “OSAC”, aims to strengthen the forensic practice through improved standards.<sup>133</sup> OSAC aims to bridge the gap between the forensic practice and the methodology.<sup>134</sup>

There have been very few reports written that look into the reliability of the current methods in Bloodstain Pattern Analysis. A panel of Bloodstain Pattern Analysts examined over 730 patterns in two phases focusing on non-absorbent surfaces such as painted wood, wallpaper,

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<sup>128</sup> *Id.*

<sup>129</sup> *Id.*

<sup>130</sup> *Id.*

<sup>131</sup> *Id.*

<sup>132</sup> *Id.*

<sup>133</sup> What Is OSAC? <https://www.nist.gov/topics/organization-scientific-area-committees-forensic-science>

<sup>134</sup> *Id.*

and chipboard.<sup>135</sup> The second phase included commonly encountered crime surfaces such as cotton sweatpants, denim jeans, representing clothing.<sup>136</sup> The criteria for being able to participate in the study included the following, (1) must have completed at least 80 hours in training in BPA, (2) must have been active in BPA casework for a minimum of five years, and (3) must be qualified by a court as an expert in BPA and have provided expert testimony.<sup>137</sup> Bloodstain patterns included four different common pattern types; blunt force impact spatter, firearms (back and forward) spatter, cast-off pattern, and expired blood pattern were included in the study.<sup>138</sup> There was also two manipulated variables related to pattern construction, the extent of the pattern produced on the target and the surface that the pattern was created on.<sup>139</sup> The analysts that consented to the study were informed that the aim of the study was to learn about reliability of the BPA methodology not competency of the analysts.<sup>140</sup> Twenty-seven analysts made judgements on fifteen to sixteen patterns each. This yielded four hundred and thirteen different assessments.<sup>141</sup> In those cases, there was close to a fifty percent success rate.<sup>142</sup> The analysts appeared to have a higher rate of confidence in classifying cast-off and expired patterns.<sup>143</sup> The study reached the conclusion that expired patterns are particularly easily identifiable.<sup>144</sup> The amount of pattern did influence analysts correct and inconclusive decisions, but the rate of

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<sup>135</sup> Reliability Assessment of Current Methods of Bloodstain Pattern Analysis, National Report for the National Institute of Justice, Award #2010-DN-BX-K213 (March 2014), <https://www.ncjrs.gov/pdffiles1/nij/grants/247180.pdf>

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> *Id.*

<sup>139</sup> *Id.*

<sup>140</sup> *Id.*

<sup>141</sup> *Id.*

<sup>142</sup> *Id.*

<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

making judgements was quite similar.<sup>145</sup> Analysts made fewer correct decisions and more inconclusive decisions on patters that had minimum extent.

The second phase of the test included pattern classifications on fabric surfaces.<sup>146</sup> There were blunt impact spatter patterns, cast-off patterns, expired patterns, drip patterns, and transfer patterns.<sup>147</sup> When the analysts were constrained to a single pattern response in Part 1, over half of the responses recorded as “inconclusive”.<sup>148</sup> In the cases that a classification was made, there was a higher success rate than the Phase 1 surfaces.<sup>149</sup> The classification rate was sixty-four percent.<sup>150</sup> In part 2, the rate of inconclusiveness dropped 14%.<sup>151</sup> Despite being allowed to select any number of pattern classifications, 23% of these classifications did not include the correct one.<sup>152</sup> There was a higher error rate than for hard surfaces.<sup>153</sup>

The analysts were prepared to give one unambiguous classification for 51% of the cast-off patterns. This was followed by drip (48%), transfer (31%), expired (24%), and impact (18%).<sup>154</sup> There was a lack of success in identifying satellite stains from drip patterns.<sup>155</sup> This supported the conclusion that cast-off patterns are most easily identifiable and satellite stains from drip patterns are the most problematic.<sup>156</sup> There was also a significant difference in the frequency of correct, incorrect and inconclusive responses for the maximum extent patterns

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<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*

<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> *Id.*

<sup>151</sup> *Id.*

<sup>152</sup> *Id.*

<sup>153</sup> *Id.*

<sup>154</sup> *Id.*

<sup>155</sup> *Id.*

<sup>156</sup> *Id.*

compared to the minimum extent. Analyst's accuracy improved as the amount of pattern increased.

The main focus of the study was spatter and transfer.<sup>157</sup> Transfer stains were created by drawing blood-soaked cotton glove across the target surface, showing four fingers.<sup>158</sup> Spatter stains were created by using a hammer to strike one drop of blood.<sup>159</sup> On the 104 conclusions given, over half (52.8%) were recorded as inconclusive, (32.7%) correctly assigned the sequence and 14.4% gave an incorrect interpretation.<sup>160</sup> The results appear to show that when spatter stains are deposited on transfer stains, analysts were more willing to give a conclusion, and those conclusions are more likely to be correct.<sup>161</sup> Overall, the effect of substrate on correct response was not significant.<sup>162</sup> As the extent of the spatter increased, in both spatter on transfer and transfer on spatter combinations, there was a higher number of correct interpretations.<sup>163</sup> The bloodstains in this study were allowed to dry completely between the two positions, there were no perimeter stain effects to give clues as to the order of deposition.<sup>164</sup> There were no perimeter stain effect to give clues as to the order of deposition.<sup>165</sup> The results of the study provide the first of its kind, overall error rates in the classification method in BPA.<sup>166</sup> Generally, when the pattern was more difficult to recognize, analysts became more conservative in their judgement.<sup>167</sup> The court would likely expect that from reliable method.<sup>168</sup> Study results showed that where a

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<sup>157</sup> *Id.*

<sup>158</sup> *Id.*

<sup>159</sup> *Id.*

<sup>160</sup> *Id.*

<sup>161</sup> *Id.*

<sup>162</sup> *Id.*

<sup>163</sup> *Id.*

<sup>164</sup> *Id.*

<sup>165</sup> *Id.*

<sup>166</sup> *Id.*

<sup>167</sup> *Id.*

<sup>168</sup> *Id.*

scenario was offered that deliberately pointed analysts towards a classification, the proportion of misclassifications that resulted significantly lower than observed for pattern neutral scenarios.<sup>169</sup> It seems that prudent practitioners and agencies to take steps to minimize the effects of contextual information in the practice of BPA.<sup>170</sup> The report concluded that the BPA community as a whole should agree on a standard methodology for the analysis of bloodstain patterns.<sup>171</sup>

The report suggests a better distinction between classification and reconstruction and relies less on mechanistic descriptions of patterns. The study recommended that these steps be under-pinned by further research into an understanding of the decision-making steps taken by BPA analysts during pattern classification and developing their objective methods to classify patterns. This report can be used by trial attorneys to cross-examine bloodstain pattern analysts and display the lack of methodology when drawing their “expert” conclusions on the stand. An influential state commission said that the blood-spatter analysis used to convict a former stated that it was “not accurate or scientifically supported” and the expert who testified was “entirely” wrong.<sup>172</sup> The findings of the Texas Forensic Science Commission, which is a national leader in science reform, called into question the conviction of Joe Bryan, who has now spent over thirty years in prison.<sup>173</sup> The findings were released during a commission meeting in July of 2018, which gave fresh urgency to the pleas of Mr. Bryan, who is now 77 and in poor health, for a new trial.<sup>174</sup> Mr. Bryan had been attending a principals convention in Austin, 120 miles from where the murder of his wife occurred, in the days surrounding the murder.<sup>175</sup> He has always

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<sup>169</sup> *Id.*

<sup>170</sup> *Id.*

<sup>171</sup> *Id.*

<sup>172</sup> He Has Spent Three Decades in Prison. Now Experts Dispute the Evidence.

<https://www.nytimes.com/2018/07/24/us/joe-bryan-blood-spatter.html>

<sup>173</sup> *Id.*

<sup>174</sup> *Id.*

<sup>175</sup> *Id.*

maintained that he was asleep in his Austin hotel room at the time of the crime.<sup>176</sup> The commission that questioned his conviction was created by Texas Legislature in 2005, and is made up of seven scientists, one prosecutor and one defense attorney.<sup>177</sup> The commissions inquiry into the case has also drawn attention to the re-examination of bloodstain-pattern analysis itself.

The commission examined the training of some of the discipline’s practitioners who have been admitted as expert witnesses in courts across the country despite having completed no more than a weeklong course in bloodstain interpretation.<sup>178</sup> Robert Thorman was a police detective from Harker Heights, Tex., with 40 hours of training in bloodstain-pattern analysis, was a key prosecution witness in the Bryan case.<sup>179</sup> His testimony about a blood-specked flashlight found by the victim’s brother in the trunk of Mr. Bryans car four days after the murder was the linchpin of the prosecution’s case.<sup>180</sup> The connection the flashlight had to the crime was unclear. In order to secure guilty verdict, the prosecution needed to tie the flashlight to the crime scene.<sup>181</sup> Mr. Thorman testified that based on his assessment of the photographs of the flashlight, the “back spatter” was a pattern that indicated close range shooting.<sup>182</sup> The prosecution and Mr. Thorman wove a narrative that the flashlight was present at the crime scene and that the killer held it in one hand while he shot Mickey Bryan, his wife.<sup>183</sup> At a meeting in July of 2018, a blood-stain pattern analyst Celestina Rossi, provided a critical assessment of Thorman’s testimony.<sup>184</sup> Rossi stated that “if any juror relied on any part of his testimony to render a verdict, Mr. Bryan

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<sup>176</sup> *Id.*

<sup>177</sup> *Id.*

<sup>178</sup> *Id.*

<sup>179</sup> *Id.*

<sup>180</sup> *Id.*

<sup>181</sup> *Id.*

<sup>182</sup> *Id.*

<sup>183</sup> *Id.*

<sup>184</sup> *Id.*



deserved a new trial.”<sup>185</sup> Ms. Rossi’s assessment was based of off more than 60 hours of research and analysis, and supported by many of the findings about Mr. Thorman’s work.<sup>186</sup> Rossi found that the detective misstated scientific concepts and used flawed methodology and incorrectly interpreted evidence.<sup>187</sup>

On the stand, Mr. Thorman made a statement that blood evaporated after traveling 46 inches through the air.<sup>188</sup> He also testified incorrectly that “human blood has its own characteristic geometric patterns”.<sup>189</sup> According to Rossi, neither of these assertions pertained directly to the evidence in the case, but they showed Mr. Thorman’s fundamental lack of understanding of basic principles.<sup>190</sup> Rossi dismantled the prosecutions single most important contention: that the blood spattered flashlight was at the crime scene and held by the killer.<sup>191</sup> Rossi’s finding carried particular weight because she is a law enforcement officer and she was not a paid expert retained by the defense.<sup>192</sup> Rossi frequently testifies as a prosecution witness in trials throughout the state and is a crime scene investigator with the Montgomery County Sheriff’s office in Conroe, Tex.<sup>193</sup> Efforts by Mr. Bryan to have DNA analysis performed on previously untested evidence were blocked by District Attorney Adam Sibley, of Bosque County.<sup>194</sup> This testing would include further analysis of the flashlight.<sup>195</sup> Sibley and his office filed an appeal of its 2017 court ruling that had ordered testing to begin.<sup>196</sup> The commission

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<sup>185</sup> *Id.*

<sup>186</sup> *Id.*

<sup>187</sup> *Id.*

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

<sup>191</sup> *Id.*

<sup>192</sup> *Id.*

<sup>193</sup> *Id.*

<sup>194</sup> *Id.*

<sup>195</sup> *Id.*

<sup>196</sup> *Id.*

announced its primary findings at a hearing attended by some of the states foremost jurists and forensic scientists. This may make it more difficult to justify his ongoing efforts to prevent further DNA Testing. In August of 2018, Mr. Bryan's attorneys asked for a new trial, they maintained that the murder conviction was built on faulty forensics.<sup>197</sup> At his trial, many people had come believing his innocence, including former high school students that had not seen Mr. Bryan since the 80's.<sup>198</sup> The evidentiary hearing was a culmination of years of efforts to have the case re-examined.<sup>199</sup> The evidentiary hearing will meet again once the DNA results will be available.<sup>200</sup>

## V. CONCLUSION

Cases like Julie Rea, David Camm, and Joe Bryan, show how bloodstain pattern analysis can eliminate the ability to obtain justice for some. The issue doesn't appear to be entirely with blood-pattern stain analysis itself. The three cases discussed all had experts that drew conclusions beyond the bounds that their methodology could justify. Expert witness who base their testimony outside of their claimed area of expertise damage lives of the wrongly convicted, but also call into question the very integrity of the legal system in the United States. The story of experts like Mr. Englert, Mr. Shaler, and Mr. Thorman disregard for accurate forensics and willingness to jump to weave their testimony in with the prosecutions desires is alarming.

Even under the Daubert factors, the courts still face an up-hill battle in excluding experts who testify beyond their bounds. Looking at cases similar to Julie Rea's, David Camm's, and Mr. Bryan's display the problems with the current evidentiary system itself. Practitioners must

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<sup>197</sup> *Id.*

<sup>198</sup> *Id.*

<sup>199</sup> Joe Bryan's Attorneys Ask for A New Trial, <https://www.propublica.org/article/joe-bryans-attorneys-ask-for-new-trial-say-murder-conviction-built-on-faulty-forensics>

<sup>200</sup> *Id.*

convince courts that there is a lack of probative value to an expert witness testifying when they go beyond the bounds of what their methodology can account for. It is exceptionally difficult for a jury to ignore or reduce their reliance on expert testimony entirely. Examining cases similar to above not only show the problems with the *Daubert* hearing process, but also display the need for improvement and refinement of the forensic methods that Blood-Stain Pattern Analysis utilize to draw their conclusions.