

# The Computer Must be Right: Computer Generated Animations, Unfair Prejudice and *Commonwealth v. Serge*

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## I. INTRODUCTION

The phrase “garbage in, garbage out” describes a key concern when dealing with computers,<sup>1</sup> but the Pennsylvania Supreme Court disregarded this concern in categorically trusting computer generated animations in criminal trials.<sup>2</sup> Computers do not think for themselves; they act on the commands of the programmer.<sup>3</sup> There is an inherent unfairness in allowing determinations of guilt or innocence to be made in criminal cases based on evidence that can be manipulated,<sup>4</sup> but sometimes expert testimony is so complicated or confusing that a party must employ a computer generated animation (CGA) to illustrate the opinion for the jury.<sup>5</sup>

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<sup>1</sup> Adam T. Berkoff, Comment, *Computer Simulations in Litigation: Are Television Generation Jurors Being Misled?*, 77 MARQ. L. REV. 829, 852-53 (1994). Despite all the case law and scholarship on this topic, Pennsylvania had not yet ruled on the issue of computer generated evidence.

<sup>2</sup> See *Commonwealth v. Serge*, 896 A.2d 1170, 1176 (Pa. 2006) (deciding that computer generated animations would be treated as any other demonstrative evidence, admissible as long as the rules of evidence are fulfilled).

<sup>3</sup> Karen D. Butera, *Seeing is Believing: A Practitioner's Guide to the Admissibility of Demonstrative Computer Evidence*, 46 CLEV. ST. L. REV. 511, 523 (1998).

<sup>4</sup> Carlo D'Angelo, *The Snoop Doggy Dogg Trial: A Look at How Computer Animation Will Impact Litigation in the Next Century*, 32 U.S.F.L. REV. 561, 577 (1998).

<sup>5</sup> Berkoff, *supra* note 1, at 829. A “computer generated animation” is a drawing created by a computer,

Although CGAs have probative value in helping the jury understand testimony, their unfair prejudice makes the admissibility determination a tough one. People, by their nature, remember more information presented visually than orally,<sup>6</sup> putting an enormous burden on defendants to rebut evidence jurors may not even realize they will subconsciously remember more clearly. This is not to say that CGA use should be eliminated entirely. When a CGA is needed in a case, the burden on defendants to rebut may be diminished through the use of mandatory limiting instructions both before and after viewing the CGA.

Production costs for CGAs have continually dropped, leading to increasing use,<sup>7</sup> but even at a lower cost some defendants cannot afford such evidence. Without any resources to obtain an expert or another CGA to counter the prosecution's CGA, the public defender has no recourse to rebut the evidence and develop an adequate defense.<sup>8</sup> This unfairly prejudicial burden, combined with the burden imposed on any defendant to overcome visually-based evidence, make the indigent defendant's situation nearly impossible without help. To even the playing field for indigent defendants to obtain justice, courts should incorporate financial difficulty into the unfair prejudice analysis in determining admissibility.

Pennsylvania law had not decided the admissibility of CGAs until *Commonwealth v. Serge* in 2006. In this case, the Pennsylvania Supreme Court held that CGAs should be treated as any other demonstrative evidence, making them admissible as long as the rules of evidence are fulfilled.<sup>9</sup> The Court noted both the unfair prejudice for the typical defendant, and the prejudice to indigent defendants in particular, but quickly dismissed both.<sup>10</sup> This decision seems to open the door for further discussions and legal developments in the evolution of computer generated animation admissibility.

This case note examines *Commonwealth v. Serge* as Pennsylvania's first attempt at regulating the use of computer generated animations in criminal court, and discusses possible solutions that Pennsylvania could use to reduce the inherent unfair prejudice posed by CGAs for all defendants, and indigent defendants in particular. Section II of this note gives a detailed description of the facts and procedural history that contributed to the court's decision in *Serge*. Section III explains the court's opinions and reasoning behind its decisions. Section IV provides a brief overview of the unsettled law in Pennsylvania dealing with CGAs, as well as law from other jurisdictions who have dealt with such evidence. Section V examines the Pennsylvania Supreme Court's decision in *Serge* in light of the unfair prejudice created by the introduction of computer generated animation, especially its effect on

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assembled frame by frame to produce the image of motion and illustrate the already formed opinion of a witness. F. Galves, *Where the Not So Wild Things Are: The Federal Rules of Evidence, and the Need for Institutional Reform and More Judicial Acceptance*, 13 HARV. J.L. & TECH. 161, 227-30 (2000). This is contrasted with a "computer generated simulation," in which a computer program uses inputted data and the principles of science to draw a conclusion. *Serge*, 896 A.2d at 1175. Both computer generated animations and computer simulations are types of computer generated exhibits or evidence.

<sup>6</sup> Roy Krieger, *Now Showing at a Courtroom Near You . . . Sophisticated Computer Graphics Come of Age – and Evidence Will Never Be the Same*, 78 A.B.A.J. 92, 92 (1992); Berkoff, *supra* note 1, at 846; Butera, *supra* note 3, at 513.

<sup>7</sup> D'Angelo, *supra* note 4, at 563.

<sup>8</sup> *Id.* at 582-83.

<sup>9</sup> *Serge*, 896 A.2d at 1176.

<sup>10</sup> *Id.* at 1183, 1185.

indigent defendants, and proposes several ways the courts can try to alleviate the unfair prejudice CGAs propose.

## II. FACTS & PROCEDURAL HISTORY

Michael Serge shot his wife, Jennifer, in the back and the chest in the early hours of January 15, 2001 with a .44 magnum revolver.<sup>11</sup> Police arrested Serge and charged him with one count of first-degree murder and one count of third-degree murder.<sup>12</sup> Serge admitted to killing his wife, but claimed he killed her in self defense.<sup>13</sup> Almost nine hours after the shooting, Serge's blood alcohol content was measured as 0.10.<sup>14</sup> Serge also claimed that this measurement showed that he was too intoxicated to form the specific intent necessary for first-degree murder or the degree of malice aforethought necessary for third-degree murder.<sup>15</sup>

The Commonwealth filed a motion *in limine* seeking to present a computer generated animation as demonstrative evidence to illustrate the opinions of its forensic pathologist, Dr. Gary Ross, and its crime scene reconstructionist, Trooper Brad Beach, as to how the shooting occurred.<sup>16</sup> The animation showed Serge shooting his wife in the lower back, then through the heart as she knelt on the floor.<sup>17</sup> More importantly, the animation showed the Commonwealth's theory on the locations of Serge and his wife, their body positions, and the trajectory of the bullets fired from Serge's gun.<sup>18</sup> The issue of the admissibility of a CGA was an issue of first impression in Pennsylvania.<sup>19</sup>

Dr. Ross' original autopsy report did not produce a definitive conclusion on which shot occurred first.<sup>20</sup> Dr. Ross performed Jennifer Serge's autopsy, concluding that she was shot twice, one bullet entering her back and exiting her abdominal region, and one bullet passing through her right upper arm before penetrating her right chest cavity, piercing her lungs and heart, and exiting the left side of her chest.<sup>21</sup> Dr. Ross classified the death as a criminal homicide, but could not determine with a reasonable degree of medical certainty which bullet entered Jennifer's body first.<sup>22</sup>

However, after Dr. Ross reviewed outside information, he determined which shot came first. Trooper Beach prepared 14 diagrams, including the crime scene dimensions, body positions, bullet impact, and bullet paths, based on measurements and physical evidence collected at the crime scene.<sup>23</sup> Based on Trooper Beach's

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<sup>11</sup> Commonwealth v. Serge, 837 A.2d 1255, 1257 (Pa Super. Ct. 2003), *app. granted*, 580 Pa. 8 (2004), *aff'd*, 896 A.2d 1170 (Pa. 2006).

<sup>12</sup> *Serge*, 896 A.2d at 1173.

<sup>13</sup> Commonwealth v. Serge, 58 Pa. D. & C. 4th 52, 55 (Common Pleas 2001), *motion granted*, 837 A.2d 1255 (Pa Super. Ct. 2003), *app. granted*, 580 Pa. 8 (2004), *aff'd*, 896 A.2d 1170 (Pa. 2006).

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

<sup>15</sup> *Serge*, 58 Pa. D. & C. 4th at 55. The opinion does not mention whether Serge drank after the shooting.

<sup>16</sup> *Id.* at 54.

<sup>17</sup> *Serge*, 896 A.2d at 1175.

<sup>18</sup> *Id.*

<sup>19</sup> *Serge*, 58 Pa. D. & C. 4th at 54.

<sup>20</sup> *Id.* at 55.

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

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

<sup>23</sup> *Id.* at 56.

data, Dr. Ross produced a supplemental autopsy report stating that the gunshot to Jennifer Serge's back was the first shot, and the shot to her arm as the second shot.<sup>24</sup> He also asserted that Jennifer had been moved at some point between her death and the time the crime scene photographs were taken.<sup>25</sup>

The Commonwealth's motion *in limine* to present the video re-enactment of Jennifer Serge's murder claimed that the re-enactment by a demonstrative evidence company could "accurately reconstruct the shooting of Jennifer Serge using the autopsy report, firearm report, crime scene photographs and crime scene measurements."<sup>26</sup> The Commonwealth claimed the video would show the fact that Michael Serge acted with malice and specific intent to kill, negating any self-defense claims by Serge.<sup>27</sup> The defense advanced an unfair prejudice argument; the re-enactment should be denied because the video amounts to one expert's opinion of how the offense occurred and the video would compel jurors to give greater weight to the reconstruction without considering the weakness of the underlying opinion.<sup>28</sup>

At an evidentiary hearing over the admissibility of the reconstruction, Andre Stuart of 21st Century Forensic Animations, the company hired by the Commonwealth to re-create the incident, testified that the video would not be a re-enactment but a "visual exhibit" or "animated exhibit."<sup>29</sup> These exhibits are simply graphical representations of an expert's opinion and do not present the company's opinion or even the company's interpretation of the expert's opinion.<sup>30</sup> Stuart stated that the hardware and software used by 21st Century in preparing the exhibits are generally accepted in the field of computer science.<sup>31</sup> 21st Century had not created the animation depicting the crime scene in this case before the hearing, but showed an animation created for *Commonwealth v. Scher* as an example of his handiwork.<sup>32</sup>

The Commonwealth argued that 21st Century's methodology is generally accepted as reliable within the scientific community so it should be admissible under *Frye v. United States*.<sup>33</sup> The Commonwealth produced the report of Trooper Beach and the supplemental report of Dr. Ross, along with still images of 21st Century's animated exhibit.<sup>34</sup> 21st Century produced an initial draft of the animation for the court about a week later, and a revised version soon after that.<sup>35</sup>

The trial court granted the Commonwealth's motion *in limine* and allowed the

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<sup>24</sup> *Serge*, 58 Pa. D. & C. 4th at 56.

<sup>25</sup> *Id.* at 56-57.

<sup>26</sup> *Id.* at 54.

<sup>27</sup> *Id.* at 57.

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

<sup>29</sup> *Serge*, 58 Pa. D. & C. 4th at 57-58.

<sup>30</sup> *Id.* at 58.

<sup>31</sup> *Id.* at 58.

<sup>32</sup> *Id.* at 59 (citing *Commonwealth v. Scher*, no. 1996-CR-174 (Susq. Cty. 1997), *rev'd*, 732 A.2d 1278 (Pa. Super. 1999), *app. granted*, 561 Pa. 693, 751 A.2d 189 (2000) (refusing to address the admissibility of the exhibit because it was produced by Commonwealth well beyond deadline for trial exhibit disclosure)).

<sup>33</sup> 293 F. 1013 (D.C. Cir 1923). *Frye* set the standard for admitting expert testimony in trials; under *Frye*, opinions are admissible only if the subject requires special experience or knowledge of experts skilled in the particular science, art, or trade, and the opinion has gained general acceptance in the expert's particular field. *Id.* at 1014.

<sup>34</sup> *Serge*, 837 A.2d at 1258.

<sup>35</sup> *Serge*, 58 Pa. D. & C. 4th at 59-60.

introduction of the CGA as demonstrative evidence.<sup>36</sup> The trial court compared the CGA to a human animator drawing each frame of activity based on information supplied by experts, then fanning through the frames to make characters appear to be moving.<sup>37</sup> The court classified the evidence as more like a chart or diagram than a scientific exhibit.<sup>38</sup> Therefore, the court needed no determination of scientific acceptance; the animation would be admissible as long as it was authenticated, relevant, probative, and limited with instructions.<sup>39</sup>

At the criminal trial held January 29, 2002 to February 12, 2002, the court allowed the jury to view the CGA.<sup>40</sup> The jury also heard Dr. Ross' testimony that he believed Jennifer was first shot in the lower back from three to five feet away while she walked away from the shooter and fell to her knees as the first bullet exited her abdomen.<sup>41</sup> He testified that the second bullet, entering her arm, then her chest cavity where it pierced her lungs and heart, proved to be the fatal bullet causing her to fall face first to the floor.<sup>42</sup> He claimed this fall caused a circular abrasion on her left cheek from her eyeglass lens.<sup>43</sup> Trooper Neumyer again testified that the presence of lead residue on her clothing revealed that Jennifer was shot from less than 21 inches away.<sup>44</sup> The Commonwealth argued that Serge intentionally shot his wife in the back, fired a second shot which missed her, then stood less than 21 inches away to fire the fatal shot while Jennifer was on her knees.<sup>45</sup>

Serge advanced a few different defenses in the shooting, but nothing proved successful. Serge argued that Jennifer had attacked him with a knife, so he acted in justifiable self-defense in shooting her.<sup>46</sup> He alternatively argued that he was so intoxicated when he shot Jennifer he was incapable of formulating specific intent to kill.<sup>47</sup> After hearing all of this testimony, the jury convicted Serge of first-degree murder. The court sentenced him to life imprisonment later that day.<sup>48</sup>

Serge appealed his conviction and sentence to life imprisonment, challenging several jury instructions and evidentiary rulings, including the trial court's admission of the computer-generated evidence.<sup>49</sup> The Superior Court found that the trial court did not abuse its discretion in admitting the computer generated evidence<sup>50</sup> because it qualified as demonstrative evidence and fulfilled all the appropriate requirements.<sup>51</sup>

Serge appealed his sentence of life imprisonment to the Supreme Court of

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<sup>36</sup> *Serge*, 896 A.2d at 1174-75.

<sup>37</sup> *Id.* at 1186-87.

<sup>38</sup> *Serge*, 58 Pa. D. & C. 4th at 75.

<sup>39</sup> *Id.* at 76, 78, 82-83.

<sup>40</sup> *Serge*, 896 A.2d at 1175.

<sup>41</sup> *Serge*, 837 A.2d at 1258.

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

<sup>43</sup> *Id.*

<sup>44</sup> *Id.*

<sup>45</sup> *Id.* at 1258-59.

<sup>46</sup> *Serge*, 837 A.2d at 1259.

<sup>47</sup> *Id.*

<sup>48</sup> *Serge*, 896 A.2d at 1173.

<sup>49</sup> *Serge*, 837 A.2d at 1257.

<sup>50</sup> *Id.* at 1264.

<sup>51</sup> *Id.* at 1262-64.

Pennsylvania.<sup>52</sup> He alleged that the Commonwealth's use of CGA lacked proper authentication, lacked proper foundation, and was cumulative and unfairly prejudicial.<sup>53</sup> The Pennsylvania Supreme Court allowed the appeal on the issue of whether the admission of the computer-generated animation reflecting the Commonwealth's theory of the crime was proper.<sup>54</sup>

### III. COURT'S ANALYSIS

The Pennsylvania Supreme Court's first point was that our society is increasingly dependent on computers, and that law should evolve with society instead of inhibiting its progress.<sup>55</sup> As Justice Newman wrote for the plurality, as society advances technologically, demonstrative evidence evolves as well,<sup>56</sup> and the law should be flexible enough to accommodate such evolution.<sup>57</sup> If expert witnesses used traditional methods instead of evolving technology, they would have drawn chalk diagrams on a blackboard.<sup>58</sup> Instead, experts can use CGAs; the Court determined that the law should not prohibit professional employment of new technology in the courtroom.<sup>59</sup>

The Supreme Court classified three different types of evidence: testimonial evidence, documentary evidence, and demonstrative evidence.<sup>60</sup> The issue in this case involved demonstrative evidence, given for the purpose of clarifying other evidence.<sup>61</sup> The Court cited a case from New Mexico, *State v. Tollardo*, which treated CGAs as admissible demonstrative evidence if they satisfied New Mexico's Rules of Evidence, which were equivalent to the Pennsylvania Rules of Evidence 401, 402, 403, and 901.<sup>62</sup>

The Supreme Court laid out a three prong test for determining whether CGAs, or any other demonstrative evidence, is admissible in court: authentication, relevancy, and prejudice.<sup>63</sup> The offering party must authenticate demonstrative evidence, often by testimony from a witness who has knowledge that the matter is what it is claimed to be.<sup>64</sup> The Commonwealth fulfilled the first prong, proper authentication, by using testimony from 21st Century's director, Trooper Beach, Dr. Ross, police officers from the crime scene, and the creator of the CGA, each testifying that they believed the animation was accurate.<sup>65</sup>

Serge unsuccessfully argued that the CGA was scattered with choices

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<sup>52</sup> *Serge*, 896 A.2d at 1173.

<sup>53</sup> *Id.* at 1176.

<sup>54</sup> *Commonwealth v. Serge*, 858 A.2d 1159 (Pa. 2004) (granting *Serge*'s appeal to the Supreme Court on the issue of admissibility of computer generated evidence).

<sup>55</sup> *Serge*, 896 A.2d at 1176.

<sup>56</sup> *Id.* at 1177.

<sup>57</sup> *Id.* at 1178.

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> *Id.* at 1177.

<sup>61</sup> *Id.* at 1177 (citing 2 MCCORMICK ON EVIDENCE § 212 (5th ed. 1999)).

<sup>62</sup> *Id.* at 1176 (citing *State v. Tollardo*, 77 P.3d 1023 (N.M. Ct. App. 2003)).

<sup>63</sup> *Id.* at 1181-83.

<sup>64</sup> *Id.* at 1177.

<sup>65</sup> *Id.* at 1179-80.

unsupported by the record.<sup>66</sup> The Court found, however, that alleged inconsistencies highlight that this is simply an illustration of the Commonwealth's theory.<sup>67</sup> The animation is not guaranteed to be 100% accurate, but is in a range consistent with the experts' findings.<sup>68</sup> Serge highlighted the inconsistencies on cross-examination, reducing the animation's credibility, so it was enough to be admissible that the CGA was what it purported to be – a depiction of Commonwealth witnesses' testimonies.<sup>69</sup>

Next, the Pennsylvania Supreme Court decided that the animation satisfied the second prong of the test, relevance, because it clearly, accurately, and concisely depicted the Commonwealth's theory of the case without extraneous graphics or information.<sup>70</sup> Serge argued that even if the animation was relevant, it was cumulative and should not be admissible.<sup>71</sup> The Court disagreed, stating that demonstrative depictions have long been allowed in evidence; even if the animation was nothing new, it was a clear and precise depiction.<sup>72</sup>

The CGA also passed the final prong of the test,<sup>73</sup> and ultimately the overarching principle in determining if any type of evidence should be admitted, a balancing test of probative value versus prejudicial effect.<sup>74</sup> Although recognizing the potential danger of CGAs due to the visual nature of the presentation, the Pennsylvania Supreme Court said the content was not inflammatory or prejudicial, and that any potential prejudice was not from the depiction itself, but from the inherent reprehensibility of murder.<sup>75</sup> The animation was not unfairly prejudicial because it did not include inflammatory elements, such as sounds, facial expressions, lifelike movements, transitions, or evidence of injury such as blood.<sup>76</sup> The Court found that any danger in the visual appeal of a computer animation is vitiated through cautionary instructions, which the court recommended to reduce prejudice.<sup>77</sup>

Serge argued that public policy should prevent use of expensive CGAs, because his entire defense fund was lower than the amount spent for one CGA.<sup>78</sup> The Supreme Court also rejected this argument, in part because the argument was not raised at trial, but also because the Commonwealth is not obligated to pay for the defense's use of experts.<sup>79</sup> However, the Court suggested that future courts weigh

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<sup>66</sup> *Id.* at 1181.

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

<sup>68</sup> *Id.* at 1181.

<sup>69</sup> *Id.* at 1181-82.

<sup>70</sup> *Id.* at 1182.

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

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

<sup>73</sup> *Id.* at 1183.

<sup>74</sup> *Id.* at 1177 (citing *Commonwealth v. Hawk*, 709 A. 2d 373, 376 (Pa. 1998)).

<sup>75</sup> *Id.* at 1183.

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

<sup>77</sup> *Id.* at 1186-87.

<sup>78</sup> *Id.* at 1183.

<sup>79</sup> *Id.* at 1185. However, in some cases, Pennsylvania courts have held that an indigent defendant deserves an expert opinion. See discussion of indigent defendants, *infra* Section IV (citing *Commonwealth v. Curnutte*, 871 A. 2d 839, 842 (Pa. Super. 2005), where the court recognized that the state cannot discriminate against defendants due to indigence, and imposed upon the state an affirmative duty to give indigent defendants the same safeguards as those who can afford them).

the relative monetary positions of parties in deciding whether to admit the CGA.<sup>80</sup>

Three justices filed concurring opinions in this case, all agreeing with the admissibility of the CGA, but each suggesting different procedural requirements. Chief Justice Cappy introduced three factors for the trial court to consider when ruling on the Commonwealth's request to admit a CGA as evidence.<sup>81</sup> First, he wrote that the Court should require the Commonwealth to file a motion *in limine* to present a CGA<sup>82</sup> to ensure close attention to whether the CGA would help the trier of fact understand the evidence or determine the fact at issue.<sup>83</sup> He agreed with the majority that the normal considerations governing demonstrative evidence should apply to CGAs, and that providing an indigent defendant with a CGA is a discretionary question for the court and not a bright-line test, but felt that the balance between probative value and unfair prejudice could be upended with a large financial disparity between the Commonwealth and the defense.<sup>84</sup> Chief Justice Cappy agreed with the majority that the trial court properly instructed the jury in this case about the purpose of the animation.<sup>85</sup> However, Cappy did not support the majority's simple recommendation of limiting instructions for the jury; he would require such limiting instructions in all future cases introducing a CGA in evidence.<sup>86</sup>

Justice Castille also agreed with the majority's decision that a CGA was admissible in this case, but had reservations about declaring CGAs generally admissible because of policy and supervisory considerations.<sup>87</sup> Justice Castille emphasized that the content of the computer's product always depends on some subjective human agency, so a court should not necessarily put all its faith in such a product.<sup>88</sup> The CGA does not reflect conclusions of the computer, but conclusions of the Commonwealth's witnesses as related to and interpreted by the CGA creator,<sup>89</sup> manipulated and modified until they are acceptable, coloring the finished product.<sup>90</sup> Justice Castille also took issue with the cost of such technology, especially in relation to the end-product.<sup>91</sup> He wrote that in a case with two well-funded parties, each will have the resources to hire experts to create a CGA or challenge the opponent's CGA.<sup>92</sup> In a criminal case involving an indigent defendant, however, the costs of an expert generating a CGA for the defendant, and challenging the

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<sup>80</sup> *Serge*, 896 A.2d at 1185.

<sup>81</sup> *Id.* at 1188 (Cappy, C.J., concurring).

<sup>82</sup> In this case, the Commonwealth did file a motion *in limine* to introduce a CGA, but the court did not require it. *Serge*, 58 Pa. D. & C.4th at 55. The plurality recommended filing a motion *in limine*, but would allow parties to file a motion to introduce CGAs as soon as need arose, even after the trial begins. *Serge*, 896 A.2d at 1174-75 n.2. The Supreme Court recognized that the further along the trial is, the higher the likelihood of unfair prejudice outweighing probative value, but neither party should be penalized for being unable to foresee the testimony of all witnesses. *Id.*

<sup>83</sup> *Serge*, 896 A.2d at 1188 (Cappy, C.J., concurring).

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

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

<sup>86</sup> *Id.* at 1188 (Cappy, J., concurring).

<sup>87</sup> *Id.* at 1188-89 (Castille, J., concurring).

<sup>88</sup> *Id.* at 1189.

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

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

<sup>91</sup> *Id.* at 1189 (Castille, J., concurring).

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

prosecution's CGA, would fall on the state.<sup>93</sup> If this funding was denied, the appointed counsel would be burdened with attempting to teach himself in a field in which he likely would not be an expert.<sup>94</sup>

After reviewing the "essentially benign end-product" of 15 seconds, which cost \$10,000 to \$20,000, Justice Castille questioned the worth of such a product, pointing out that the jury can "get the picture" through more economical means such as testimony and diagrams.<sup>95</sup> He took exception to the plurality's dicta that an indigent defendant is not entitled to funds to produce a competing CGA,<sup>96</sup> because it was not properly before the Court. Furthermore, he agreed with Chief Justice Cappy that the option should remain open to provide an indigent defendant with the funds necessary to challenge a CGA introduced by the Commonwealth.<sup>97</sup> Justice Castille also emphasized that the fact that the majority held CGAs admissible at the discretion of the trial judge does not give either party an enforceable right to introduce the evidence.<sup>98</sup> In his view, the wisest move for the trial judge would be to exclude the CGA entirely in situations where the defense cannot obtain equivalent evidence.<sup>99</sup>

Justice Eakin, like the other concurring justices, agreed that the plurality reached the correct result, but he disagreed with the court's discussion of weighing the parties' relative monetary positions in ruling on CGA's admissibility.<sup>100</sup> Justice Eakin began by writing that the issue of finances was waived, so the plurality's discussion of finances was dangerous.<sup>101</sup> He concentrated on relevance as the key to admissibility, and disagreed with the plurality's perceived departures from that rule.<sup>102</sup> First, he wrote that admissibility is not a function of the parties' finances; if one side chooses to develop evidence, its admissibility should not rest on a determination of the relative resources of the other side.<sup>103</sup> If the defendant needs evidence he cannot afford, he should ask the court for the money, and the court will determine whether he is entitled to the money according to the existing rules.<sup>104</sup> Justice Eakin emphasized that the remedy for indigence was not to disregard the rules of evidence or prevent the other side from presenting evidence.<sup>105</sup>

Justice Eakin also determined that although the discussion of motions *in limine* was unnecessary because the issue was not raised, mandatory motions *in limine* would be an inappropriate solution.<sup>106</sup> Justice Eakin stressed again that relevance is the key to admissibility, not timing.<sup>107</sup> Trials are fluid and constantly changing; what

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<sup>93</sup> *Id.*

<sup>94</sup> *Id.*

<sup>95</sup> *Id.* at 1189-90.

<sup>96</sup> *Id.* at 1190 (Castille, J., concurring).

<sup>97</sup> *Id.*

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

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

<sup>100</sup> *Id.* at 1190 (Eakin, J., concurring).

<sup>101</sup> *Id.* at 1190 (Eakin, J., concurring).

<sup>102</sup> *Id.* at 1190-91.

<sup>103</sup> *Id.* at 1190.

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

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

<sup>106</sup> *Id.* at 1190-91 (Eakin, J., concurring).

<sup>107</sup> *Id.* at 1191.

is planned for one moment is of no use the next.<sup>108</sup> Finally, Justice Eakin discussed the role of the rules of evidence in the context of CGAs.<sup>109</sup> In his understanding, a CGA appears no different from any other visual evidence, such as a chart or drawing.<sup>110</sup> Thus, our existing rules of admissibility, discovery, and motions cover CGAs as well as other visual evidence, so there is no need for a special rule of admissibility for CGAs.<sup>111</sup>

#### IV. PRIOR LAW

Although the Pennsylvania Supreme Court has not declared a bright-line rule for admitting computer generated animations, criminal and civil courts have generally admitted computer evidence that complies with the Pennsylvania Rules of Evidence. For example, Rule 901(a) requires evidence to be authenticated, to ensure that the evidence supports a finding that the matter is what it purports to be.<sup>112</sup> Such authentication can take the form of testimony from a witness with knowledge of what the evidence is proclaimed to be.<sup>113</sup>

Pennsylvania courts have heard cases involving the admissibility of demonstrative evidence for over fifty years. The first demonstrative evidence issue the Pennsylvania Supreme Court dealt with was the admissibility of photographs.<sup>114</sup> The Supreme Court, in an automobile accident personal injury case, found that photographs of the accident intersection two years later were admissible because they were authenticated as to permanent features of the intersection, and limiting instructions were given to the jury about the photographs' evidentiary value.<sup>115</sup> According to Justice Larsen's dissent in a computer generated simulation case, the court should not allow the use of computer generated opinions and evidence at trial without assurances of reliability and opportunity for the parties to challenge the computer's accuracy.<sup>116</sup> Justice Larsen pointed out that there are many steps along the way which can let in error, and when computer generated evidence is used to deprive a person of liberty, the judicial system must demand both a high degree of reliability and enough information for the jury to determine whether any garbage went into the evidence.<sup>117</sup>

Lower courts have not hesitated to exclude computer generated evidence that lacks an adequate level of reliability. The Commonwealth Court upheld the

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<sup>108</sup> *Id.*

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

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

<sup>111</sup> *Id.* at 1191 (Eakin, J., concurring).

<sup>112</sup> PA. R. EVID. 901(a) (2006).

<sup>113</sup> PA. R. EVID. 901(b)(1).

<sup>114</sup> *Nyce v. Muffley*, 384 Pa. 107, 111 (1956) (admitting photographs within trial judge's discretion; finding that photograph must be verified by testimony of person who took it or someone with knowledge that it fairly and accurately depicts what it is supposed to depict). Demonstrative evidence is evidence intended merely to aid the trier's understanding of the facts. *Hamilton v. Pa. Dept. of Env'tl. Res.*, 1992 E.H.B. 1366 (1992) (rejecting map with computer generated contour lines due to lack of evidence that method of generating lines is accepted among hydrogeologists).

<sup>115</sup> *Nyce*, 384 Pa. at 111.

<sup>116</sup> *Commonwealth v. Klinghoffer*, 522 Pa. 562, 570 (1989) (Larsen, J., dissenting). The Supreme Court of Pennsylvania dismissed without explanation an improvidently granted appeal in this case.

<sup>117</sup> *Id.* at 566-69.

exclusion of computer generated animations of an automobile accident because the animations were not sufficiently similar to the actual accident.<sup>118</sup> In this civil case, the plaintiffs introduced two accident reconstructions, neither of which truly recreated the details of the actual event.<sup>119</sup> The Appellant argued that the animations were dissimilar because the animator did not know information such as the distance between the vehicles in traffic, the impact angle at second impact, and when a car fire began,<sup>120</sup> as in *Serge* where the Commonwealth could not prove they knew the starting position of the body, where Jennifer was when she was shot, and whether her body was moved.<sup>121</sup>

In a Philadelphia civil car accident case, *Quigg v. Brown*, the Common Pleas Court questioned the wisdom of admitting CGA as demonstrative evidence because it contained a more precise re-enactment of the accident than available evidence provided.<sup>122</sup> The court admitted the evidence, but included a footnote noting that the animation inaccurately portrayed the topography of the accident area and presented a more precise view than was warranted by the available information.<sup>123</sup> As in *Serge*, where the computer animators did not have a full picture but created a scene using its own and the Commonwealth's assumptions and theories,<sup>124</sup> the *Quigg* plaintiffs implied a determination of where the impact occurred.<sup>125</sup> The *Quigg* case ended in a defense verdict so admitting the evidence did not affect the outcome.

No specific national standard for CGA admissibility exists; most states seem to admit the evidence unless there appears to be a defect. Several states have admitted CGAs after the court considered factors affecting admissibility including but not limited to relevance, unfair prejudice, and probative value.<sup>126</sup> One case closely resembling the *Serge* case is *State v. Harvey*;<sup>127</sup> however, there are some key differences which could change the analysis. This case involved a police officer who shot his wife multiple times and claimed self defense, the exact situation established in *Serge* except for choice of weapon.<sup>128</sup> The *Harvey* prosecution introduced a computer generated animation depicting Mrs. Harvey's position each time she was shot, including the final shots while she was bent over or on her knees,

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<sup>118</sup> Harsh v. Petroll, 840 A.2d 404, 424 (Pa. Commw. Ct. 2003).

<sup>119</sup> *Id.* at 421.

<sup>120</sup> *Id.* at 423.

<sup>121</sup> *Serge*, 896 A.2d at 1175.

<sup>122</sup> *Quigg v. Brown*, 30 Phila. 468, 490 n.72 (1996).

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

<sup>124</sup> *Serge*, 896 A.2d at 1175.

<sup>125</sup> *Quigg*, 30 Phila. at 471-73.

<sup>126</sup> *See, e.g.*, *People v. Cauley*, 32 P.3d 602, 607-08 (Colo. Ct. App. 2001) (agreeing with the trial court's CGA admission because it "conducted a careful and thorough review," ensuring the admissibility requirements were met); *Pierce v. State*, 718 So. 2d 806, 808-10 (Fla. Dist. Ct. App. 1997) (upholding the trial court's admission of CGA evidence because it weighed all of the evidentiary factors in determining the evidence admissible); *State v. Sayles*, 662 N.W.2d 1, 11 (Iowa 2003) (upholding the trial court's admission of a CGA because "the trial court properly applied the law and made reasonable judgments that enjoyed support in the record"); *Mintun v. State*, 966 P.2d 954, 958-59 (Wyo. 1998) (upholding the trial court's admission of CGA evidence because it did not offend rules of evidence).

<sup>127</sup> 649 So. 2d 783, 788-89 (La. 1995) (admitting CGA into evidence because recreations do not need to be exact in every detail as long as the important elements of the test are identical or very similar to the scene).

<sup>128</sup> *Id.* at 785. Differentiating these cases, *Harvey* claimed his wife had a gun whereas *Serge* claimed his wife had a knife.

and a possible position of the body after the shooting.<sup>129</sup> However, in *Harvey* the medical examiner determined the body positions during the autopsy, and the animation simply depicted these scientifically determined positions. In *Serge*, however, Dr. Ross could not determine to any certainty the exact position of the body and whether it had been moved or not.<sup>130</sup> The more definite medical conclusions lend extra credibility to the particular *Harvey* CGA and further its admissibility.

Some states have excluded CGA evidence, although most states have not fully examined CGAs' potential effect on the jury and have instead found other reasons to exclude. Although ultimately admitting the CGA, Minnesota recognized the need for close scrutiny due to the CGA's dramatic power in *Ramsey County v. Stewart*.<sup>131</sup> Many states excluded evidence containing too many inaccuracies or too large an inaccuracy, because misleading the jury and creating unfair prejudice do not comport with the system's goal of justice.<sup>132</sup>

One case from Tennessee is similar to *Serge*, and its exclusion of a defendant's CGA helps to underscore the dangerousness of CGAs.<sup>133</sup> In *State v. Hall and Dixon*, the defendant Dixon, charged with the premeditated murder of his friend's ex-girlfriend's new boyfriend, challenged the trial court's exclusion of his CGA depicting his story that he was in his car when the shooting occurred.<sup>134</sup> While this CGA was introduced to illustrate a lay witness' testimony instead of an expert, and was ultimately determined cumulative as well, the court cited important commentary from *State v. Farner*, an automobile accident case, connected it to this murder case, and upheld the exclusion of the CGA.<sup>135</sup> In *Farner*, a CGA was excluded because the animation portrayed the cars driving at 73.88 miles per hour when police officers did not make a precise determination on the cars' speeds,<sup>136</sup> as in *Serge* where the Commonwealth's CGA portrayed body positions not necessarily supported by definite medical conclusion.<sup>137</sup> The *Farner* court asserted that "[b]ecause the jury may be so persuaded by its life-like nature that it becomes unable to visualize an opposing or differing version of the event, the requirement that the animation fairly and accurately portray the event is particularly important when the evidence at issue

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<sup>129</sup> *Id.* at 789.

<sup>130</sup> *Serge*, 58 Pa. D. & C.4th at 55-56.

<sup>131</sup> 643 N.W. 2d 281, 296 (Minn. 2002) (urging courts that "[b]ecause of its dramatic power, proposed animations must be carefully scrutinized for proper foundation, relevancy, accuracy, and the potential for undue prejudice").

<sup>132</sup> *See, e.g.*, *Moore v. Casperson*, 345 F.3d 474, 489 (7th Cir. 2003) (upholding the trial court's exclusion of CGA because it "did not accurately account for possible movement by persons or for placement of objects in the room"); *Clark v. Cantrell*, 339 S.C. 369, 381-85 (S.C. 2000) (affirming decision of trial court to reject CGA when it was inconsistent with prior testimony and other evidence); *State v. Hultenschmidt*, 102 P.3d 192, 197-98 (Wash. 2004) (upholding the exclusion of a CGA depicting a hypothetical situation with no foundational testimony).

<sup>133</sup> *State v. Hall and Dixon*, 2005 Tenn. Crim. App. LEXIS 87, \*30-36 (2005) (upholding the trial court's rejection of CGA partly because it was not necessary for the defendant's testimony and amounted to cumulative evidence).

<sup>134</sup> *Hall and Dixon*, 2005 Tenn. Crim. App. LEXIS at \*30.

<sup>135</sup> *Id.* at \*33 (finding the trial court should not have admitted the CGA because it as speculative, as there was no evidence to back up the details) (citing *State v. Farner*, 2000 Tenn. Crim. App. LEXIS 515, \*61-78 (2000)).

<sup>136</sup> *Hall and Dixon*, 2005 Tenn. Crim. App. LEXIS at \*33.

<sup>137</sup> *Serge*, 58 Pa. D. & C.4th at 55-56.

is a computer animated recreation.”<sup>138</sup> The court recognized such life-like animations must be held to a particularly strict requirement of accuracy because they are so persuasive.<sup>139</sup> As the Mississippi Supreme Court heard in testimony in *Cox v. State*, because of current technology in computer animation, it is possible to create an animation showing anything as real.<sup>140</sup>

Pennsylvania law affords indigent defendants some evidentiary protections regarding expert testimony to prevent unfair prejudice due to the defendants’ limited resources. The Pennsylvania Constitution provides each criminally accused the right to be confronted with witnesses against him and to have compulsory process for obtaining witnesses in his favor.<sup>141</sup> This right, combined with the court’s general inherent authority to appoint experts,<sup>142</sup> gives the indigent defendant a statutory basis for utilizing expert witness opinions when necessary.

One Pennsylvania case provided expert assistance for indigent defendants in a case where the expert’s assessment was the critical issue. In *Commonwealth v. Curnutte*, the Pennsylvania Superior Court found that without assistance of an expert (in this case, a mental health expert in a Megan’s Law proceeding) the defendant loses an opportunity to raise questions in the trier of fact’s mind about the proof against him, which can sometimes be the turning point in a case.<sup>143</sup> Here, the Court determined that it is fundamentally unfair to afford the defendant the statutory right to call expert witnesses, and then preclude the defendant from exercising this statutory right because he cannot afford it, rendering the right insignificant.<sup>144</sup> The Superior Court went on to assert that the legislature did not intend to give the indigent defendant the right to appointed counsel and then deny this counsel the ability to effectively represent the defendant.<sup>145</sup> The Court recognized that the state cannot discriminate against defendants due to indigence, and imposed upon the state an affirmative duty to give indigent defendants the same safeguards as those who can afford them.<sup>146</sup> This reasoning was upheld in a later case with similar facts.<sup>147</sup>

The *Curnutte* court was quick to point out that this decision does not obligate the Commonwealth to pay for all requested experts, and that this is a fact-specific determination, but it draws parallels in *Serge*.<sup>148</sup> This court would provide *Curnutte*

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<sup>138</sup> *State v. Farner*, 66 S.W.3d 188, 209 (Tenn. 2001).

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

<sup>140</sup> *See Cox v. State*, 849 So. 2d 1257, 1273 (Miss. 2003) (hearing from an FBI specialist that “because of current technologies in computer animation, it was possible to create an animation showing literally anything as ‘real,’ when it was not based on any facts”).

<sup>141</sup> PA. CONST. art. 1, § 9 (2006).

<sup>142</sup> PA. R. EVID. 614; *Commonwealth v. Correa*, 437 Pa. Super. 1, 6 n.2 (1994) (appointing a third expert to determine cause of death in voluntary manslaughter case where first two experts provided conflicting testimony).

<sup>143</sup> *Curnutte*, 871 A. 2d at 843 (citing *Ake v. Oklahoma*, 470 U.S. 68, 84 (1985)).

<sup>144</sup> *Id.* at 842, 844.

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

<sup>146</sup> *Id.* at 842 (citing *Commonwealth v. Franklin*, 823 A.2d 906, 909 (Pa. Super. 2003) (remanding rape and corruption of minor case because he was deprived of assistance of counsel on his direct appeal because he could not afford it); *Commonwealth v. Sweeney*, 533 A.2d 473, 480 (Pa. Super. 1987) (remanding robbery case for appointment of new counsel for defendant when he could no longer afford his counsel)).

<sup>147</sup> *Commonwealth v. McWilliams*, 887 A.2d 784, 785-86 (Pa. Super. 2005).

<sup>148</sup> *Curnutte*, 871 A.2d at 842.

with a psychological expert because Curnutte was indigent, the Commonwealth presented expert testimony that Curnutte was a sexually violent predator, Curnutte's attorney did not have the expertise to refute this opinion, and without an expert, Curnutte's right to counsel would be meaningless.<sup>149</sup> As in *Curnutte*, Serge was indigent, the Commonwealth presented an expert/computer generated animation testifying and showing the jury that he believed Serge shot his wife while she was on the ground, Serge's attorney did not have the expertise to refute the animation, so without an expert the assistance of counsel on this point would be meaningless.

#### V. PERSONAL ANALYSIS

The *Serge* court plurality is quick to dismiss the unfair prejudice of powerful tools such as CGAs. Absent an examination of the innate effect of computer generated evidence on juries' decision making processes, the court should not assume its probative value overwhelms any prejudice. "A two-minute video, if well made, will make a greater impression on the minds and emotions of jurors than the world's best expert. Once jurors see the video, the images will be graven on their minds."<sup>150</sup> CGAs enable the jury to sit back and watch the scenario in question instead of attempting and failing to understand a "string of statistics and facts,"<sup>151</sup> and this ease of explanation and impression is both the best argument for its value and the most persuasive argument against its use.<sup>152</sup> Because CGAs can be very useful as demonstrative evidence if used neutrally, such as giving both sides the opportunity to present, eliminating their use altogether would not best serve the judicial process. A combination of legislative and judicial solutions is the best way to utilize the positive demonstrative aspects of CGAs while diminishing the dangers posed by CGA use.

Although computer generated animations can have probative value in helping the trier of fact understand a particular expert's testimony,<sup>153</sup> there is considerable potential for prejudice in using a perceived "scientific" method to aid understanding. After all, jurors are human, and can be impressed by scientific jargon, even if the information is only *perceived* as scientific.<sup>154</sup> In computer simulation cases, this impression can be amplified by the actual production of an opinion by computer simulations.<sup>155</sup> Likewise, in the computer animation context, the assumption of "reality based" characteristics of computers combined with potential manipulation of

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<sup>149</sup> *Id.* at 840-41.

<sup>150</sup> Berkoff, *supra* note 1, at 829 (citations omitted).

<sup>151</sup> *Id.* at 829; *see also* Krieger, *supra* note 6, at 92 ("A recent ABA study on jury comprehension demonstrated that technical issues or complex fact patterns leave jurors confused, bored and frustrated. Jurors, often 'overwhelmed by the sheer volume of information,' reported difficulty remembering important facts and deciding critical issues as a result"). When jurors can just see what they would ordinarily have explained to them, their entire comprehension may increase. *See infra* note 158 for discussion on increased comprehension.

<sup>152</sup> Berkoff, *supra* note 1, at 829.

<sup>153</sup> Krieger, *supra* note 6, at 92 (discussing the many ways computer graphics can help transform complex or technical fact patterns into understandable data, illustrate testimony, reveal subtle evidentiary relationships, explore case theories, or examine alternate theories).

<sup>154</sup> Mark I. Bernstein, *Expert Testimony in Pennsylvania*, 68 TEMP. L. REV. 699, 700-01 (1995).

<sup>155</sup> *See id.* at 710 (arguing that juries must decide cases on reality-based testimony, and testimony based on photogrammetrically produced results may mask the inaccuracy of underlying factual basis).

data creates prejudice.<sup>156</sup> The animation illustrates an already-formed expert opinion, so significant details can be de-emphasized by highlighting other details the expert feels better illustrate his or her opinion.<sup>157</sup> Such high-tech evidence may persuade a jury for the wrong reasons because the graphics are colorful, entertaining, or logical; not because the underlying facts are convincing.<sup>158</sup>

Opponents of computer generated animations argue that there is danger when juries decide cases “because a computer must be right.”<sup>159</sup> However, the prejudicial effect of CGAs may ultimately lie in the difference in retention rates between media.<sup>160</sup> Studies have shown that visual presentation alone is more effective than verbal communication alone,<sup>161</sup> and that information received from a variety of methods is retained at drastically higher levels than information received from one method alone.<sup>162</sup> One study showed that individuals retain eighty-seven percent of information presented visually, compared to only ten percent of material presented orally.<sup>163</sup> Thus, the logical conclusion is that a computer animation, as a visual presentation to be combined with oral testimony, will have a higher retention rate than oral testimony alone.<sup>164</sup>

In addition to the general unfair prejudice issues presented by computer animations, the potential for prejudice multiplies in cases involving indigent defendants. In *Serge*, the Supreme Court noted that the Commonwealth has no

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

<sup>157</sup> Berkoff, *supra* note 1, at 851; D’Angelo, *supra* note 4, at 577.

<sup>158</sup> Berkoff, *supra* note 1, at 852-53 (citations omitted); D’Angelo, *supra* note 4, at 576 (“While studies support the notion that jurors learn more by seeing evidence than by simply hearing it, there is also a risk that, when dealing with computer animation, they may disregard what they hear and believe only what they see.”).

<sup>159</sup> Berkoff, *supra* note 1, at 855 (“There is a great danger to our legal system if those individuals who decide the fate of our legal controversies do so ‘because a computer must be right’”); *see* Butera, *supra* note 3, at 529 (noting that “[c]omputerization carries with it a public perception of precision and infallibility” and that opposing counsel fears that “the jury will think ‘I saw it on TV, so it must be true,’ without examining the validity of the expert’s own underlying testimony”). In one study, college undergraduates were shown a computer animation in a mock civil case pitting a slip-and-fall theory against a suicide theory. Saul M. Kassir & Megan A. Dunn, *Computer-Animated Displays and the Jury: Facilitative and Prejudicial Effects*, 21 LAW & HUM. BEHAV. 269, 271 (1997). The first experiment showed computer animations helped to improve judgment accuracy, because when the animation reflected the actual trajectory, mock jurors believed the suicide theory more often when the body landed twenty to twenty-five feet away from the building than when it landed five to ten feet away. *Id.* at 279. However, the second experiment showed that computer animations can also prejudice a jury by their presence. *Id.* After viewing the plaintiff’s animation showing a slip and fall before the trajectory, the majority of jurors believed the slip-and-fall theory even when the body landed twenty to twenty-five feet away. *Id.* Not many jurors recognized that this path essentially defies the laws of physics. *Id.*

<sup>160</sup> *See* Berkoff, *supra* note 1, at 846 (noting different retention rates for material received aurally, visually, or both aurally and visually).

<sup>161</sup> *Id.*; *accord* Krieger, *supra* note 6, at 92 (noting research that found a 100% increase in juror retention of visual over oral material and a 650% increase in retention of combined visual and oral material over oral material alone). The same article explained that for jurors to understand and remember complexities of a case, they must see *and* hear, because one-third of the brain is devoted to visual memory. Krieger, *supra* note 6, at 92.

<sup>162</sup> *See* Berkoff, *supra* note 1, at 846 (noting that a visual, rather than merely verbal, presentation, carries greater “psychological impact” on triers-of-fact); Butera, *supra* note 3, at 513 (discussing research which shows that combining visual aids with oral presentations may increase understanding and retention levels up to sixty-five percent, and that material perceived from a variety of sources, such as aural, visual, and written methods, is retained and understood at “a substantially higher level”).

<sup>163</sup> Berkoff, *supra* note 1, at 846.

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

obligation to provide indigent defendants with expert assistance, and rejected the notion that the Commonwealth should aid a defendant in financing a CGA.<sup>165</sup> There is an “inherent unfairness” in the courts’ permitting the state to “use such powerful evidence against a defendant who cannot afford to do the same.”<sup>166</sup> Public defenders have few options when faced with the state’s computer generated animation, without the expertise to rebut the evidence, nor the resources to rebut through an expert or another computer generated animation.<sup>167</sup> There is a disturbing possibility that a wealthy defendant could afford to use CGAs to manipulate a jury into an acquittal while an indigent defendant without similar resources could not afford to employ experts, create CGAs, or mount an adequate defense and thus could be found guilty.<sup>168</sup> This disparity in the application of justice based on the defendants’ financial situations discriminates against indigent defendants.<sup>169</sup> With the already inherent prejudice posed by CGA evidence, indigent defendants face a seemingly insurmountable burden due to the court’s general admission of CGAs.

Although the courts will never be able to neutralize the persuasive effect of computer generated animations, legislative adoption of Chief Justice Cappy’s mandatory limiting instructions coupled with judicial adoption of Justice Castille’s court-funded assistance can mitigate the unfair prejudice. The *Serge* court plurality recognized the value of limiting instructions in its approval of the court’s instruction, but did not make these instructions mandatory in future cases.<sup>170</sup> The importance of mandatory limiting instructions in CGA cases has not been ignored in other states.<sup>171</sup> In order for the court to be sure juries know that a CGA is simply an illustration of one expert’s testimony and not a depiction of actual events, the court must give an instruction with that information.<sup>172</sup> Instructions before and after showing the CGA may help to remind the jury not to believe everything they see. Judicial solutions recommending limiting instructions would be a good start, but in order to guarantee compliance, instructions must be mandated. A statutory requirement of mandatory limiting instructions enacted by the legislature would ensure that the jury had at least some instruction on the nature of and weight assigned to a CGA.

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<sup>165</sup> *Serge*, 896 A.2d at 1184-85.

<sup>166</sup> D’Angelo, *supra* note 4, at 581.

<sup>167</sup> *See id.* at 582-83 (noting the “high cos[t] associated with computer animation”).

<sup>168</sup> Cf. Eric S. Siegrist, *Criminal Justice and the Indigent Defendant*, 2 USAFA J. LEG. STUD. 219, 230-31 (1991) (questioning the fairness of a poor psychiatric assistance where a hypothetical public defender trying to mount an insanity defense receives one summary psychological evaluation that deems defendant competent and sane).

<sup>169</sup> *Id.* at 230.

<sup>170</sup> *Serge*, 896 A.2d at 1186-87; *contra Serge*, 896 A.2d at 1188 (Cappy, C.J., concurring) (writing separately to express the belief that, in criminal cases where the Commonwealth wants to admit a CGA as demonstrative evidence, a limiting instruction is necessary).

<sup>171</sup> *See, e.g., Cauley*, 32 P.3d at 607-08 (upholding the trial court’s admission of CGA in part because it “gave an appropriate limiting instruction”); *Ramsey County v. Stewart*, 643 N.W.2d 281, 296 (Minn. 2002) (assigning harmless error to the trial court’s admission of CGA but commenting that “[i]n the future, if there is a proper foundation for such evidence, the [trial] court should issue a cautionary instruction relating to the animation before playing the animation to the jury and in final instructions to help insure its proper use”); *Harris v. State*, 13 P.3d 489, 494 n.7 (Okla. 2001) (affirming the trial court’s ultimate guilty verdict but warning that a cautionary instruction “shall be used, both at the presentation of the re-enactment and in the final instructions, so that the jury is not misled or confused”).

<sup>172</sup> *See Harris*, 13 P. 3d at 495 (requiring cautionary instructions when using a CGA at trial, and noting that other jurisdictions, such as South Carolina, require them as well).

The inherent prejudice that indigent defendants face would likely be lessened by a statutory requirement of mandatory limiting jury instructions. However, indigent defendants still cannot fully combat the prejudice inherent in CGAs without the resources Justice Castille suggested the court may provide.<sup>173</sup> Indigent defendants are entitled to court-appointed and funded representation, including “counsel and investigative, expert, and other services necessary for adequate representation.”<sup>174</sup> Although courts would not likely view a CGA as essential to defense, giving the state the opportunity to use powerful evidence such as a CGA against a defendant who cannot afford to use the same evidence or rebut it creates inherent unfairness in the justice system.<sup>175</sup>

Pennsylvania courts have already lessened the burden on some indigent criminal defendants by providing psychological expert assistance as a common law solution, and this solution could be transferred to the computer generated animation context. Adapting the *Curnutte* standard to CGAs,<sup>176</sup> in situations where it determines that the subject of a computer generated animation is a central issue in the trial, a Pennsylvania court should provide an indigent defendant with “the tools necessary to counter the Commonwealth’s evidence.”<sup>177</sup> *Curnutte* provided indigent defendants with access to a psychological expert where the defendant’s psychological well-being was a central issue.<sup>178</sup> However, CGAs can require as much uncommon expertise, and can be as vital to a determination of guilt, as psychological findings.<sup>179</sup> Thus, if an expert’s testimony is such a turning point in the case that the state believes it cannot proceed without a CGA, the CGA becomes as important as any other expert and should be provided for the indigent defendant. If the CGA is not such a turning point that it is necessary, then it should be excluded. This approach supports Justice Castille’s doubt that such expensive measures as CGAs are absolutely necessary in most cases.<sup>180</sup>

Because this approach involves judicial discretion, a legislative solution would not necessarily help. A common law judicial approach may be the most effective way to tackle this element of the problem. A judicially recognized solution would somewhat even the playing field between indigent defendants and non-indigent defendants, and would make the trial more about the facts and less about which side provides the only opinion. In a case involving computer generated animations, providing expert assistance, and if needed, animation resources themselves, can give a similar effect.

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<sup>173</sup> *Serge*, 896 A.2d at 1189 (Castille, J., concurring).

<sup>174</sup> 18 U.S.C.S. § 3006A (LexisNexis 2006).

<sup>175</sup> D’Angelo, *supra* note 4, at 581.

<sup>176</sup> See *Curnutte*, 871 A.2d at 843 (determining that providing indigent defendants with legal representation is not enough if the defendant also lacks the resources to provide for an expert in a turning point of the case, such as the defendant’s psychological state; providing that in such situations the court should provide the defendant with an expert to assist the defendant).

<sup>177</sup> *Id.* at 844.

<sup>178</sup> *Id.* at 843.

<sup>179</sup> Cf. *Serge*, 896 A.2d at 1189-90 (Castille, J., concurring) (arguing that CGAs require the expertise of the CGA programmer and are critical to the determination of guilt of the indigent defendant; however, “the accuracy of a CGA or computer simulation is always subject to challenge for accuracy and bias, no less than any other evidence”).

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

## VI. CONCLUSION

While no court has prohibited computer generated animations completely, it is tough to ignore the potential prejudice the evidence imposes. Research has shown that jurors exposed to visual information retain more than those given only oral information, and that the highest retention rates occur with a combination of visual and oral information.<sup>181</sup> Thus, the innately visual nature of CGAs, with the purpose of illustrating oral testimony, combine to give one side an immense advantage when the jury has an easier time remembering their theory of the case.<sup>182</sup> The *Serge* decision ignored this intrinsic prejudice, ruling that CGAs are admissible generally as long as they fulfill the evidentiary requirements for demonstrative evidence.

The *Serge* court also ignored the far-reaching impact of computer generated animations on indigent defendants. It correctly noted that the courts are not generally obligated to provide experts for indigent defendants,<sup>183</sup> but used this as an excuse not to deal with the mounting burden on these defendants. Computer generated animations, as shown previously, can influence a jury subconsciously,<sup>184</sup> and indigent defendants with little or no resources to begin with will have an even more difficult time rebutting such technology.

While there is nothing the courts can do to entirely eliminate unfair prejudice from computer generated animations, there are small steps they can take to lessen the prejudicial impact. First, mandatory jury limiting instructions before and after viewing the CGA would help to remind jurors that the CGA is just an illustration and not a true depiction.<sup>185</sup> Also, considering the financial disparity between the parties in the probative value-unfair prejudice analysis may help to lessen discrimination against indigent defendants.<sup>186</sup> If the CGA is so vital to the guilt determination that it must be admitted, then the court should be required to provide the defendant with an expert and/or CGA to combat the evidence.

Overall, the *Serge* decision represented a predictable first step in the computer generated animation admissibility conversation. This decision will likely spur further discussion, analysis, and scrutiny over the admissibility of CGA technology. Ultimately a trend toward the development and protection of CGA technology is likely. One can only hope that future courts will consider the prejudicial effects of CGAs on indigent defendants in their deliberations.

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<sup>181</sup> Krieger, *supra* note 6, at 92; Berkoff, *supra* note 1, at 846; Butera, *supra* note 3, at 513.

<sup>182</sup> *Clark*, 339 S.C. at 383-384.

<sup>183</sup> *Serge*, 896 A.2d at 1185.

<sup>184</sup> See Kassin & Dunn, *supra* note 159, at 271 (describing experiment causing mock jurors to believe animation even if it bends or breaks laws of physics).

<sup>185</sup> See *Harris*, 13 P.3d at 495 (requiring cautionary instructions when using a CGA at trial, and noting that other jurisdictions such as South Carolina require them as well).

<sup>186</sup> See *Serge*, 896 A.2d at 1189-90 (Castille, J., concurring) (refusing to separate the analysis of parties' financial situations from the unfair prejudice analysis, even if it means excluding relevant evidence).