

10-1-1996

## The Jury as Witness: Forensic Computer Animation Transports Jurors to the Scene of a Crime or Automobile Accident

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### Recommended Citation

Fulcher, Kristin L. (1996) "The Jury as Witness: Forensic Computer Animation Transports Jurors to the Scene of a Crime or Automobile Accident," *University of Dayton Law Review*: Vol. 22: No. 1, Article 4. Available at: <https://ecommons.udayton.edu/udlr/vol22/iss1/4>

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## COMMENTS

### THE JURY AS WITNESS: FORENSIC COMPUTER ANIMATION TRANSPORTS JURORS TO THE SCENE OF A CRIME OR AUTOMOBILE ACCIDENT

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## I. INTRODUCTION

*State v. Clark*<sup>1</sup> began as most criminal trials do—with the prosecution and defense presenting remarkably opposing theories of the events which led to the crime. On July 25, 1992, Tanya Banks was shot in the bathroom of an apartment which she shared with her boyfriend, Lamont Clark.<sup>2</sup> Clark, who was subsequently charged with her murder, alleged that he was sitting on the toilet when Tanya entered with a gun.<sup>3</sup> According to Clark's version of events, after a brief argument, Clark managed to obtain the gun from Banks.<sup>4</sup> Shortly thereafter, Banks reached for the barrel of the gun while sitting on the edge of the bathtub.<sup>5</sup> The gun fired, fatally wounding Banks.<sup>6</sup>

To aid in proving its theory of the case, the prosecution introduced a key piece of evidence to help the jury envision the crime scene and to disprove Clark's narration of events.<sup>7</sup> The prosecution employed a computer reconstructionist to electronically recreate the scene of the crime.<sup>8</sup> The reconstructionist's findings revealed that it was impossible for the victim to have been sitting on the tub when she was shot, or to have reached the alleged distance for the gun.<sup>9</sup> As the expert witness, the reconstructionist then testified and displayed the results of the computer reconstruction on poster-sized exhibits. After hearing the expert's testimony and weighing the other evidence, the jury found for the prosecution.

The prosecution's victory suggests the enormous power of persuasion a computer may have with a jury.<sup>10</sup> Increasingly, attorneys are using computer reconstructions in criminal cases or automobile accidents as a method of commanding the jury's attention and persuading it to find in favor of the proponent of the computer-generated evidence.<sup>11</sup> This Comment first distinguishes between the two types of computer forensic evidence, animations and simulations, while further analyzing the trend to admit computer reconstructions in trials involving accidents or crimes.<sup>12</sup> Next, this Comment discusses the current standards of admissibility for computer reconstructions.<sup>13</sup>

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1. 655 N.E.2d 795 (Ohio Ct. App.), *appeal dismissed*, 650 N.E.2d 1367 (Ohio 1995).

2. *Id.* at 799.

3. *Id.*

4. *Id.*

5. *Id.*

6. *Id.* at 799-800.

7. *Id.* at 801.

8. *Id.*

9. *Id.* at 801-02.

10. See *Cornell v. State*, 265 Ga. 904 (1995) (defense counsel introducing the reconstruction into evidence to prove its theory of an accidental, rather than an intentionally-caused, death).

11. Computer-generated forms of evidence are often labeled as animations, simulations, displays, re-enactments, re-creations and a variety of other terms, but for the purposes of this Comment, the author will refer to crime scene re-enactments and automobile accident re-creations as "computer reconstructions."

12. See *infra* notes 23-86 and accompanying text.

13. See *infra* notes 87-160 and accompanying text.

Further, this Comment argues that these reconstructions ought to be admitted as demonstrative evidence, or illustrations of expert testimony, without the need to qualify the expert's knowledge as scientific.<sup>14</sup> Finally, this Comment concludes that courts can improve the trial process by relaxing the current admissibility standards for this type of evidence.<sup>15</sup>

## II. THE COMPUTER RECONSTRUCTION

### A. *Its Place in the World of Forensic Evidence*

Trial judges are faced with the difficult task of determining which standard to apply to computer reconstructions before allowing their admission. Initially, judges were hesitant to allow computer reconstructions because of the overpowering effect of their technical capabilities on a jury.<sup>16</sup> Trial courts often found the underlying mathematical equations and principles of physics involved in computer simulations, as well as the input of data and digitized images used by computer animations, to be somewhat foreign.<sup>17</sup> Because trial judges act as evidentiary gatekeepers, they retain sizeable discretion to permit computer reconstructions sparingly, and only if necessary, to achieve fairness.<sup>18</sup> Further, appellate courts rarely overrule the decisions by trial judges concerning the admissibility of evidence.

As with any advanced technology, however, familiarity permits initial fears to subside.<sup>19</sup> While some courts remain resistant to the computer revolution, others have accepted the tremendous potential of computers to

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14. See *infra* notes 161-81 and accompanying text.

15. See *infra* notes 182-95 and accompanying text.

16. See *Bledsoe v. Salt River Valley Water Users' Ass'n*, 880 P.2d 689, 691-93 (Ariz. Ct. App. 1994); *Commonwealth v. Klinghoffer*, 564 A.2d 1240, 1240-44 (Pa. 1989) (Larsen, J. dissenting); *Sommervold v. Grevlos*, 518 N.W.2d 733, 737-38 (S.D. 1994).

17. Some courts view reconstructions as being similar to a computer simulation, which include scientific theories in the underlying data. *Romano v. State*, 917 P.2d 12, 16 (Okla. Crim. App. 1996) (classifying the computer-generated evidence of temperature conditions in an apartment as a simulation because of the underlying thermodynamic analysis); *Livingston v. Isuzu Motors, Ltd.*, 910 F. Supp. 1473, 1494-95 (D. Mont. 1995) (finding that the computer program in this case was made up of "various physical laws and equations commonly understood in science"). These courts usually require an expert witness to testify about the validity and reliability of the underlying scientific theory. *Id.* See *infra* notes 43-63 and accompanying text for a discussion of computer simulations and their admissibility requirements. While some courts classify reconstructions as simulations, it is the author's view that courts should admit them under the relaxed standard given to computer animations. See *infra* notes 25-42 and accompanying text for a discussion of the admissibility requirements for computer animations.

18. *Strock v. Southern Farm Bureau Casualty Ins. Co.*, No. 92-2357, 1993 U.S. App. LEXIS 17431, at \*4 (4th Cir. July 12, 1993) (holding that a trial judge's decision regarding whether to admit a computer animation will not be reversed without a showing of an abuse of discretion).

19. See *People v. McHugh*, 476 N.Y.S.2d 721 (N.Y. Sup. Ct. 1984). The *McHugh* court realized early the necessity for computers in the courtroom: "A computer is not a gimmick and the court should not be shy about its use, when proper. Computers are simply mechanical tools—receiving information and acting on instructions at lightning speed." *Id.* at 722-23.

improve current methods of litigation.<sup>20</sup> Soon, even the hesitant courts may be forced to acknowledge the potential of computers as the public's fascination with and knowledge of computers increases.<sup>21</sup> Further, with an increasing number of services providing inexpensive access to the Internet, even those suspicious of computers are finding the temptation to "surf the net" irresistible. Practitioners, too, are trading in their dictaphones for personal computers or laptops. These same attorneys are discovering the advantages of incorporating computers into their trial preparation, securing favorable verdicts in the process.<sup>22</sup> With the onset of the computer revolution, it is only natural for courts to follow suit and recognize the necessity of computer reconstructions to assist with efficiency and fairness during trials.

### *B. Categorizing Reconstructions*

Most courts currently categorize computer reconstructions as either animations or simulations.<sup>23</sup> A court determines which label to give a computer reconstruction by examining the attorney's purpose for including it as evidence. If the purpose for inclusion of a computer exhibit is to illustrate a witness's testimony, then courts often refer to the evidence as an animation. Animation evidence was, for example, used in the criminal trial of O.J. Simpson.<sup>24</sup> Computer simulations, however, contain scientific or physical principles, and courts require proof of the validity of the science before allowing the proponent to include it as evidence. Whether a judge decides to admit a computer reconstruction into evidence does not depend on the nature of the individual case, but on the classification given to the reconstruction by the court. Because the categorization affects admissibility requirements, an

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20. *Pierce v. State*, 671 So. 2d 186, 189-91 (Fla. Dist. Ct. App.) (finding that the trial court did not abuse its discretion in admitting a computer animation as demonstrative evidence illustrating an expert opinion), *review granted* 677 So. 2d 841 (Fla. 1996); *accord Robinson v. Missouri Pac. R.R.*, 16 F.3d 1083, 1088 (10th Cir. 1994); *Datskow v. Teledyne Continental Motors Aircraft Prods.*, 826 F. Supp. 677 (W.D.N.Y. 1993); *State v. Clark*, 655 N.E.2d 795 (Ohio Ct. App.), *appeal dismissed*, 650 N.E.2d 1367 (Ohio 1995).

21. *See generally* Mario Borelli, *The Computer as Advocate: An Approach to Computer-Generated Displays in the Courtroom*, 71 IND. L.J. 439, 456 (1996) (arguing that this hesitancy is the result of the legal profession's "deeply rooted sense of scientific mysticism" about computers).

22. *Id.* *See generally* *Using Computer Animation in the Courtroom*, PROSECUTOR, Sept.-Oct. 1995, at 17, 20; *Computer Simulation May Be Considered Real Evidence*, PROSECUTOR, Nov.-Dec. 1995, at 17, 21.

23. *See generally* William F. Lee & Lisa J. Pirozzolo, *Using Computer-Generated Evidence at Trial*, 523 PL/LIT 159 (1995). While this Comment recognizes that there are other forms of computer-generated evidence, it primarily discusses reconstructions. For an authoritative look at other forms of computer evidence, see Mary C. Kelly & Jack N. Bernstein, *Virtual Reality: The Reality of Getting It Admitted*, 13 J. MARSHALL J. COMPUTER & INFO. L. 145 (1994) (discussing the possibilities of having virtual programs entered into evidence to place jurors at the scene); Jonathan D. Kissane-Gaisford, *The Case for Disc-Based Litigation: Technology and the Cyber Courtroom*, 8 HARV. J.L. & TECH. 471 (1995) (analyzing CD-ROM and laser disc presentation devices).

24. Borelli, *supra* note 21, at 439.



overview of the distinctions between the two is warranted.

## 1. Computer Animations

The word animation often evokes mental pictures of cartoons, humor, and Disney. While courtroom animations usually are not humorous, some rely on the same underlying concept used in cartoons, mixing visual graphics with a sense of movement to embody a process or event.<sup>25</sup> Generally, the process or event depicted by the animation supports the testimony of an expert witness.<sup>26</sup> When attorneys use animations as an illustration of expert testimony, courts liken them to charts or diagrams, which require a proponent to meet the standard for demonstrative evidence.<sup>27</sup> Animations can be a computer graphic of a static object, such as a baseball, or several images of the baseball altered slightly in several frames until, for example, the baseball strikes a window.<sup>28</sup>

While animations do not look the same, courts may categorize them as similar. For instance, in a recent federal case discussing admissibility standards for computer-generated evidence, the court in *Robinson v. Missouri Pacific Railroad Company*<sup>29</sup> categorized a videotaped scale model of an accident scene as an animation.<sup>30</sup> Other courts have found different types of computer-generated evidence to be animations. In *State v. Harvey*,<sup>31</sup> the prosecution introduced "still animations" into evidence during a murder trial.<sup>32</sup> These still animations were graphic pictures drawn by a computer to illustrate the positions of the victim and the defendant, as well as the bullet's trajectory.<sup>33</sup> The prosecution qualified the animation reconstructionist as an expert and then

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25. Although computer animations do contain visuals, courts often prefer that the animation does not resemble the scene too closely. See *Pierce v. State*, 671 So. 2d 186, 191 (Fla. Dist. Ct. App.) (preferring to admit a computer animation into evidence because it did not depict facial expressions on the computer-generated mannequins used to recreate the scene of an automobile accident involving children), review granted, 677 So. 2d 841 (Fla 1996).

26. See *State v. Clark*, 655 N.E.2d 795, 801 (Ohio Ct. App.), appeal dismissed, 650 N.E.2d 1367 (Ohio 1995).

27. *People v. McHugh*, 476 N.Y.S.2d 721, 722 (N.Y. Sup. Ct. 1984) (finding that computer animations are more similar to charts or diagrams than scientific evidence); see also *Ladeburg v. Ray*, 508 N.W.2d 694, 696 (Iowa 1993) (finding computer animations were "merely mechanical drawings" and could be admitted with testimony of witness who created them); but see *Bledsoe v. Salt River Valley Water Users' Ass'n*, 880 P.2d 689, 692 (Ariz. Ct. App. 1994) (holding that animations are not the same as charts or diagrams but nonetheless are admissible under the standards for demonstrative evidence).

28. I. Neel Chatterjee, *Admitting Computer Animations: More Caution and New Approach Are Needed*, 62 DEF. COUNS. J. 36 (1995).

29. 16 F.3d 1083 (10th Cir. 1994).

30. *Id.* at 1086-87. The animator created a model of the accident scene based on the physical evidence, photographs of the area and visits to the wreck site. *Id.* at 1085-87. The model included smaller versions of the train and car involved in the accident. *Id.* at 1086. With a camera, he filmed the scene every 1/10 of a second as he moved the model vehicles by hand. *Id.* See *infra* notes 98-108 and accompanying text for a discussion of *Robinson*.

31. 649 So. 2d 783, 788 (La. Ct. App. 1995).

32. *Id.* at 788-89.

33. *Id.* at 788.

used the stills as exhibits to illustrate his testimony.<sup>34</sup> The animations depicted his opinion about the sequence of the shots in relation to the position of the shooter, and the position of the victim's body.<sup>35</sup> The court found that the animations enhanced juror understanding and had strong probative value.<sup>36</sup> Further, the court reasoned that the jury was well equipped to weigh the animation with the other pieces of evidence.<sup>37</sup>

Because animations do not draw conclusions but attempt to recreate a scene or process, courts treat them like demonstrative evidence. Demonstrative evidence is admitted if it fairly and accurately depicts the underlying testimony and assists the jury in understanding that testimony.<sup>38</sup> Under this lower admissibility standard, animations often meet with greater success finding their way into courtrooms. By contrast, the admissions standard for simulations requires the assessment of the reliability of the scientific principles underlying the simulation. Since the standard for demonstrative evidence is easier to satisfy than that for simulations, animations fare better than simulations when opposed.<sup>39</sup> Most courts faced with making an admissibility determination for a computer animation turn to *People v. McHugh*<sup>40</sup> for guidance, whether or not they agree with that court's findings. The *McHugh* court stated, "[a] computer is not a gimmick and the court should not be shy about its use, when proper."<sup>41</sup> *McHugh* stressed the importance of animations to a proper defense, provided that the animations are relevant and accurately illustrate oral testimony.<sup>42</sup>

## 2. Computer Simulations

Computer simulations are more complex than animations. To create a computer simulation, scientific experts enter data into computer models which analyze the data and reach conclusory results.<sup>43</sup> Simulations involve the "projection of possible outcomes mathematically predicted by a computer program."<sup>44</sup>

In a simulation, the expert usually begins with a theory of the case and his

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34. *Id.* at 789.

35. *Id.* at 801-02.

36. *Id.* at 814.

37. *Id.*

38. Chatterjee, *supra* note 28, at 37 (noting the proponent needs a witness to authenticate the demonstration).

39. The standard for demonstrative evidence is that it must fairly and accurately depict the underlying testimony and aid in understanding.

40. 476 N.Y.S.2d 721, 722-23 (N.Y. Sup. Ct. 1984) (noting that a proper use occurs when the results are useful, rather than confusing).

41. *Id.*

42. *Id.*

43. ANDRE A. MOENSSENS ET AL., SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES 167-72 (4th ed. 1995).

44. *Id.* at 168.

computer.<sup>45</sup> He must calculate the motions of objects from the event in question<sup>46</sup> or gather empirical data "such as size and shape of an object, time, altitude, and velocity."<sup>47</sup> After the expert enters scientific formulae into the computer, the computer processes the data.<sup>48</sup> When the expert runs the program, the simulation recreates the event and continues it beyond the stated factual basis to provide a theory of what might have happened.<sup>49</sup> Because simulations draw conclusions that may differ strikingly from one party's version of events, courts often view simulations as having independent evidentiary value.<sup>50</sup> Ordinarily, the expert records the simulation onto videotape or laserdisk to simplify viewing in court.<sup>51</sup> If the court decides to admit the evidence for its substantive value, the jury may replay the tape during deliberations.<sup>52</sup> This possibility, however, is left to the discretion of the trial court.<sup>53</sup>

Examples of simulated events may include the flow of a river, weather patterns, or the braking distance of an automobile. In *Kudlacek v. Fiat S.p.A.*,<sup>54</sup> the Supreme Court of Nebraska allowed the plaintiffs to introduce expert testimony illustrating the results of a computer simulation.<sup>55</sup> In this case, the plaintiffs' son sustained injuries in an automobile accident involving a Fiat S.p.A.<sup>56</sup> Plaintiffs alleged that Fiat Motors defectively designed the automobile by not protecting passengers from side-impact collisions.<sup>57</sup> To present their theory of the case in a concise and understandable manner, plaintiffs hired an expert to create a computer simulation of the path of the Fiat on the roadway.<sup>58</sup> To simulate the accident, the expert used a computer program referred to as the Engineering Dynamics Single Vehicle Simulator.<sup>59</sup> After entering the underlying data,<sup>60</sup> the expert ran the simulation to determine the vehicle behavior and trajectory based upon the marks on the roadway, the exit speed

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45. See generally Adam T. Berkoff, *Computer Simulations in Litigation: Are Television Jurors Being Misled*, 77 MARQ. L. REV. 829 (1994).

46. *Id.* at 829-31.

47. Timothy W. Cerniglia, *Computer-Generated Exhibits—Demonstrative, Substantive or Pedagogical—Their Place in Evidence*, 18 AM. J. TRIAL ADVOC. 1, 5 (1994).

48. *Id.*

49. *Id.*

50. Chatterjee, *supra* note 28, at 38.

51. Berkoff, *supra* note 45, at 831-32.

52. See *Pierce v. State*, 671 So. 2d 186, 188 (Fla. Dist. Ct. App.), review granted, 677 So. 2d 841 (Fla. 1996).

53. *Id.*

54. 509 N.W.2d 603 (Neb. 1994).

55. *Id.* at 617-18.

56. *Id.* at 607.

57. *Id.*

58. *Id.* at 609.

59. *Id.* at 617.

60. *Id.* at 618. The underlying data consisted of the dimensions of the Fiat S.p.A. and measurements of steering angle input and acceleration, taken from track tests and verified by other experts. *Id.*



and the angle at which the vehicle careened off the road.<sup>61</sup> The appellate court agreed that the trial court had not abused its discretion by admitting the simulation.<sup>62</sup> Generally speaking, attorneys like computer simulation programs because they compile large amounts of complex data and scientific assumptions into a simplified theory of events. For this reason, the computer simulation is the "best fit within these rules for the complex data handed to it."<sup>63</sup> The *Kudlacek* court's admission of the computer simulation as evidence represents a growing trend among courts to recognize the importance of simulation programs to the trial process.

### 3. Somewhere Between the Two: The Computer Reconstruction

Computer reconstructions of accident and crime scenes often prove troubling for courts faced with a decision whether to admit the reconstruction as evidence. As a threshold requirement, evidence must aid the jury's understanding of the case, regardless of how the court classifies it. For some courts, the reconstruction merely demonstrates the expert's view of how the events in question transpired.<sup>64</sup> Other courts favor classifying reconstructions as a simulation because these courts view them as drawing conclusions.<sup>65</sup> This Comment argues that reconstructions are based on the technical ability of the expert and therefore should be admitted as demonstrative evidence to illustrate his opinion.<sup>66</sup>

#### *a. Accident Reconstructions as Illustrations of the Events in Question*

One popular use of computer-generated evidence is to reconstruct automobile accidents.<sup>67</sup> Accident reconstruction is "the science of examining all evidence including physical evidence that exists as a result of an accident and applying that evidence to established principles of mathematics and physics in order to re-create or otherwise reconstruct the occurrence of an accident."<sup>68</sup> Accident reconstructions may provide a significant classification problem for trial judges. If the accident reconstruction presents an alternative theory of the case, rather than explaining events, then a judge should classify it as a reconstruction. Some reconstructions do not draw conclusions about the

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61. *Id.*

62. *Id.*

63. Berkoff, *supra* note 45, at 831.

64. *Datskow v. Teledyne Continental Motors Aircraft Prods.*, 826 F. Supp. 677, 686 (W.D.N.Y. 1993); *Lopez v. Foremost Paving, Inc.*, 796 S.W.2d 473, 477 (Tex. Ct. App. 1990).

65. See *Kudlacek v. Fiat S.p.A.*, 509 N.W.2d 603, 617-18 (Neb. 1994); *Livingston v. Isuzu Motors, Ltd.*, 910 F. Supp. 1473, 1494-95 (D. Mon. 1995).

66. See *infra* notes 163-81 and accompanying text.

67. See generally Gerald C. DeMaria, *Accident Reconstruction*, 450 PLI/LIT 321 (1992).

68. *Id.* at 323.

cause of the accident, but act as a witness, replaying events before the jury. Some commentators view reconstructions as explanations of what happened, rather than what might have happened.<sup>69</sup> Like animations, reconstructions are visual images recorded on videotape. Unlike animations, however, reconstructions use actual data retrieved from the accident scene.<sup>70</sup> The computer supplies the missing facts to determine the principal contributor to the accident.<sup>71</sup>

To create a successful accident reconstruction, the expert needs information from the investigation: including police reports, photographs, diagrams, eyewitness testimony, interrogatories, depositions, maps of the highway, and facts about the surrounding conditions.<sup>72</sup> The expert collects this data from police reports or investigations and enters it into a computer animation program, which reconstructs the scene.<sup>73</sup> Because the reconstructionist is best qualified to explain the procedure, courts usually require the proponent of the evidence to qualify the reconstructionist as an expert. Because the expert only illustrates his opinion with the accident reconstruction, courts should admit it as demonstrative evidence which does not require proof of scientific validity.<sup>74</sup> The accident reconstruction does not "go[] beyond [demonstrative evidence] and become[] the underpinning, indeed the entire framework, from which and only through which the expert reaches his opinion."<sup>75</sup>

#### *b. Crime Scene Reconstruction*

In *State v. Clark*,<sup>76</sup> an Ohio appellate court determined that jurors were best suited to determine which version of events was more accurate: the defendant's testimony, or a computer re-creation of the event.<sup>77</sup> An expert witness for the prosecution reconstructed the scene with the aid of AutoCAD and data from the police report.<sup>78</sup>

Police detectives provided the photographer with data, including: dimensions of the bathroom, location of the bathtub, location of various

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69. Berkoff, *supra* note 45, at 831.

70. DeMaria, *supra* note 67, at 326.

71. Berkoff, *supra* note 45, at 830 n.3.

72. DeMaria, *supra* note 67, at 326.

73. *Id.*

74. James E. Starrs, *Recent Developments in Federal and State Rules Pertaining to Medical and Scientific Testimony*, 34 DUQ. L. REV. 813, 821 (1996).

75. *Id.* at 821-22.

76. 655 N.E.2d 795 (Ohio Ct. App.), *appeal denied*, 650 N.E.2d 1367 (Ohio 1995).

77. *Id.* at 814.

78. *Id.* at 809-10. AutoCAD is the brand name for a software program similar to an electronic drafting table. *Id.* Many engineering professionals use this program, which maintains sixty percent of the market share, to design automobiles or aircraft, or aid in the construction of bridges, buildings, and highways. *Id.*

fixtures, the width of the walls, and the location of the defect or bullet hole.<sup>79</sup> The photographer entered all of the data into AutoCAD.<sup>80</sup> After testing various positions of the defendant in the bathroom, the model reached a theory of the case strikingly different than defendant's theory of self-defense.<sup>81</sup> Prosecutors used the expert witness's testimony, based on the results of the computer simulation, to show that defendant's version of events was impossible.<sup>82</sup>

Although the court allowed the use of computer simulations in *Clark* to disprove a defendant's theory of the case, other courts have not been as receptive. In *Cornell v. State*,<sup>83</sup> the Supreme Court of Georgia upheld a trial court's determination that the defendant could not introduce a reconstruction of the crime scene as evidence.<sup>84</sup> The defendant was on trial for felony murder and sought to introduce the computer simulation to prove his theory of accidental death.<sup>85</sup> The court determined that the trial judge had complete discretion to refuse to admit the reconstruction into evidence if the judge found that the defendant had not established an adequate foundation.<sup>86</sup>

### III. THE KEY TO SUCCESSFUL ADMISSIBILITY FOR THE COMPUTER RECONSTRUCTION

The successful introduction of a computer reconstruction depends upon the acquisition of an expert witness. The reconstruction's proponent should question the reconstructionist during his case-in-chief, while allowing the reconstructionist to illustrate his testimony with the computer-generated evidence. Further, to lay an appropriate foundation, the reconstructionist should know the workings of the computer program, as well as the underlying data which he entered into the computer. The extent and nature of the expert's testimony depends on the proponent's proposed use of the reconstruction during the proceedings.<sup>87</sup> If a proponent intends to employ the reconstruction to illustrate a theory rather than to prove its truth, the expert need only testify that the reconstruction will help the jury understand his opinion about what happened.<sup>88</sup> To authenticate the reconstruction, the proponent must have the expert testify as to the reliability of the underlying processes and calculations.<sup>89</sup>

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79. *Id.*

80. *Id.* at 810.

81. *Id.*

82. *Id.*

83. 463 S.E.2d 702, 703 (Ga. 1995).

84. *Id.* at 703.

85. *Id.*

86. *Id.* The court further stated that the trial judge's discretion "will not be controlled unless abused."  
*Id.*

87. *Lee & Pirozzolo, supra* note 23, at 181-84.

88. *Id.*

89. FED. R. EVID. 901(b)(9). See *infra* notes 125-53 and accompanying text for the necessary authentication requirements for computer reconstructions.

The proponent of the reconstruction may have to surmount additional evidentiary hurdles if the evidence draws a conclusion or is offered for the truth of the matter it asserts. Even though a court may refuse to admit the evidence for its substantive value, as long as the expert testifies, the jury will still view the computer display. Thus, the reconstruction proponent should attempt to qualify the reconstructionist as an expert under Rules 702 and 703 of the Federal Rules of Evidence.

#### *A. The Necessity of Expert Testimony for Admissibility*

Under Rule 702 of the Federal Rules of Evidence,<sup>90</sup> a proponent must qualify the reconstructionist as an expert to explain the reliability of and sources for the theories involved in the reconstruction. Since the reconstructionist created the computer-generated evidence, he is considered best suited to explain the processes he used. Although the Federal Rules do not contain a standard for determining the admissibility of testimony about scientific procedures or theories, the Supreme Court addressed the scope of Rule 702 in *Daubert v. Merrell Dow Pharmaceutical, Inc.*<sup>91</sup> Today, the *Daubert* standard governs the admissibility of expert testimony based on scientific evidence in federal courts.<sup>92</sup>

#### *1. The Effects of Daubert & Frye on Computer Reconstructions*

Prior to *Daubert*, the admissibility of scientific evidence was governed by the standard established in *Frye v. United States*.<sup>93</sup> The United States Court of Appeals for the District of Columbia held in *Frye* that for expert testimony based on scientific evidence to be admissible, it must be "a well recognized scientific principle" and have "gained general acceptance in the particular field in which it belongs."<sup>94</sup> Although some state courts still rely on the *Frye* standard,<sup>95</sup> for purposes of federal court analysis, *Frye* has been overruled.<sup>96</sup> By specifically overruling the older *Frye* test in *Daubert*, the Supreme Court clearly expanded the admissibility of expert testimony based on scientific evidence. Under the standard articulated in *Daubert*, if the scientific knowledge assists the trier of fact in understanding the evidence, it is

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90. "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." FED. R. EVID. 702.

91. 113 S. Ct. 2786 (1993).

92. *Id.*

93. 293 F. 1013 (D.C. Cir. 1923).

94. *Id.* at 1014. See generally Cerniglia, *supra* note 47, at 10.

95. States are free to adopt their own admissibility standards, and some still prefer the *Frye* standard. See, e.g., *Pierce v. State*, 671 So. 2d 186 (Fla. Dist. Ct. App.), *review granted*, 677 So. 2d 841 (Fla. 1996).

96. *Daubert v. Merrell Dow Pharmaceutical, Inc.*, 113 S.Ct. 2786 (1993).



admissible.<sup>97</sup>

In one of the only federal cases to decide the issue, the Tenth Circuit Court of Appeals applied the reasoning of *Daubert* and allowed admission of a computer animation to illustrate an expert's testimony.<sup>98</sup> In *Robinson v. Missouri Pac. R.R.*,<sup>99</sup> the court found that the trial judge did not abuse his discretion in admitting a video animation to illustrate how an accident occurred.<sup>100</sup> The accident involved an automobile and a moving train.<sup>101</sup> To reconstruct the scene, the animator created a scale model of the accident.<sup>102</sup> By incrementally advancing the positions of the car and train and filming the scene with still motion photography, the reconstructionist created a "dramatic two-minute silent color video" depicting the events.<sup>103</sup>

The *Robinson* court concluded that the *Daubert* standard applied because the "physical phenomena of crash movements may be explained on scientific principles."<sup>104</sup> The court admitted the animation as an illustration of the expert's testimony because it helped explain the events.<sup>105</sup> The court found that the animation correctly conformed to the expert's testimony, and that the jury could appropriately weigh the reconstruction with the underlying expert opinion.<sup>106</sup> The court held that "[c]ourts in appropriate circumstances may permit demonstrative use of audio or visual presentations which may assist the jury."<sup>107</sup> Because the purpose for the exhibit was illustrative, the court determined that the opportunity for cross-examination would protect against the jury affording the reconstruction too much weight.<sup>108</sup>

## 2. The Various State Standards for Admissibility of Reconstructions

State courts interpret scientific testimony using one or more of several available standards. For instance, in *Pierce v. State*,<sup>109</sup> a Florida appeals court determined that a computer reconstruction was not subject to the *Frye* guidelines.<sup>110</sup> In *Pierce*, the prosecution used a computer generated re-creation to demonstrate how the defendant's reckless driving caused the death of a six

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97. *Id.* at 2795-96.

98. *Robinson v. Missouri Pac. R.R.*, 16 F.3d 1083, 1089 (10th Cir. 1994).

99. *Id.* at 1083.

100. *Id.* at 1088-89.

101. *Id.* at 1085.

102. *Id.* at 1086. The animator based the model on investigations from the scene, photographs and on-site visits. *Id.*

103. *Id.*

104. *Id.* at 1089.

105. *Id.* at 1088.

106. *Id.* at 1087.

107. *Id.* at 1088 (citing *Datskow v. Teledyne Continental Motors Aircraft Prods.*, 826 F. Supp. 677 (W.D.N.Y. 1993)).

108. *Id.* at 1087.

109. 671 So. 2d 186 (Fla. Dist. Ct. App.), *review granted*, 677 So. 2d 841 (Fla. 1996).

110. *Id.* at 190.



year old girl who was crossing the street in a residential neighborhood.<sup>111</sup> The animator used a laser beam technique to scan 3,200 photos and maps of the scene.<sup>112</sup> He then entered measurements into the AutoCAD program to draw the vehicles, buildings and other pertinent objects from the scene.<sup>113</sup> Using the computer and some of the same techniques employed by Disney to produce cartoon films, the program converted the information from the investigation into graphic scenes.<sup>114</sup> The Florida trial judge admitted the computer accident reconstruction into evidence solely as an illustration.<sup>115</sup> A jury convicted the defendant of vehicular homicide.<sup>116</sup> On appeal, the court upheld the trial court's determination.<sup>117</sup> The court found there had not been undue emphasis placed on the animation, which was used as an illustration of the expert's opinion.<sup>118</sup> The court also noted that effective cross-examination should have exposed any inconsistencies to the jury.<sup>119</sup>

### 3. The Basis for the Expert's Opinion: Scientific or Technical?

Departing from traditional judicial reservations about admitting computer-generated reconstructions unless they met the scientific evidence standard, an Ohio appellate court<sup>120</sup> found that an expert witness based his testimony on "technical" rather than "scientific" evidence.<sup>121</sup> The *Clark* court held that, since testimony by a reconstructionist fell into the technical category, *Daubert* did not apply.<sup>122</sup> The court first engaged in an analysis to determine whether the witness was qualified "in the field of crime scene reconstruction, using computer-assisted or electronic drafting."<sup>123</sup> Then, the court considered whether the methodology was reliable.<sup>124</sup> This court's departure from viewing reconstructionist testimony as grounded in scientific theories seems to suggest the transition of computer re-creations from the area of scientific evidence, to an established and common method of introducing expert opinion. Although the *Clark* court applied more lenient standards to crime scene reconstruction expert testimony than some other courts might have applied, it still required the

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111. *Id.* at 187.

112. *Using Computer Animation in the Courtroom*, *supra* note 22, at 20.

113. *Pierce*, 671 So. 2d at 188.

114. *Using Computer Animation in the Courtroom*, *supra* note 22, at 20.

115. *Pierce*, 671 So. 2d at 188.

116. *Id.* at 187.

117. *Id.* at 191.

118. *Id.*

119. *Id.*

120. *State v. Clark*, 655 N.E.2d 795, (Ohio Ct. App.), *appeal dismissed*, 650 N.E.2d 1367 (Ohio 1995).

121. *Id.* at 812.

122. *Id.* In *Daubert*, the Supreme Court did not adopt a standard for "technical or other specialized knowledge." *Daubert v. Merrell Dow Pharmaceutical, Inc.*, 113 S. Ct. 2786 (1993).

123. *Clark*, 655 N.E.2d at 811.

124. *Id.*

proponent to correctly authenticate the reliability of the underlying data and processes used to develop the reconstruction.

*B. Authentication Standards as a Combination of Federal Rules and State Requirements*

Notwithstanding the Ohio court's acceptance of the expert testimony in *Clark*, the court still required authentication as a scientific test, rather than compliance with the less stringent demonstrative evidence standard.<sup>125</sup> The *Clark* court applied a standard<sup>126</sup> announced by the Supreme Judicial Court of Massachusetts in *Commercial Union Insurance Co. v. Boston Edison*.<sup>127</sup> In *Commercial Union*, the court adopted a standard similar to Rule 901(9) of the Federal Rules of Evidence, which governs the authentication requirements for a process or system.<sup>128</sup> This standard requires a "showing that: (1) the computer is functioning properly; (2) the input and underlying equations are sufficiently complete and accurate (and disclosed to the opposing party, so that they may challenge them); and (3) the program is generally accepted by the appropriate community of scientists."<sup>129</sup> In adopting this standard, *Commercial Union* adhered to the *Frye* tradition of requiring general acceptance in the scientific community. Even though *Daubert* subsequently overruled *Frye*, some jurisdictions continue to apply the *Frye* test. The court noted in *Clark*, some jurisdictions in Ohio have rejected the test requiring a showing of general acceptance.<sup>130</sup> Notwithstanding this recognition by the court, it still found that computer-generated reconstructions were accepted by the scientific community, as evidenced by its recognition of cases admitting them.<sup>131</sup> To meet this requirement, the expert must explain the operation of the computer program and show the reliability of the equipment. Opposing counsel will often not object to this finding, and the testimony will be unnecessary. Once the proponent of the reconstruction qualifies the witness as an expert, the expert can authenticate the reconstruction without much effort.

In *People v. McHugh*<sup>132</sup> the court analogized computer re-creations to

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125. *Clark*, 655 N.E.2d at 812.

126. *Id.*

127. *Commercial Union Ins. Co. v. Boston Edison Co.*, 591 N.E.2d 165, 168 (Mass. 1992).

128. FED. R. EVID. 901(b)(9). The rule provides that "[e]vidence describing a process or system used to produce a result and showing that the process or system produces an accurate result." *Id.* Thus, a witness may have to explain what data they entered into the computer, how the computer works and whether the equipment is reliable. *Lee & Pirozzolo*, *supra* note 23, at 185. This is a question decided by the trial judge. *Id.* at 187-89.

129. *Commercial Union*, 591 N.E.2d at 168; *Clark*, 655 N.E.2d at 812.

130. *Clark*, 655 N.E.2d at 812.

131. *Id.* at 812-13.

132. 476 N.Y.S.2d 721 (N.Y. Sup. Ct. 1984); see *supra* notes 40-42 and accompanying text for a discussion of *McHugh*.

charts or diagrams illustrating expert testimony.<sup>133</sup> To meet this demonstrative evidence standard, state courts usually require a threshold showing by the expert that "there is substantial similarity between conditions existing at the time of the occurrence giving rise to the litigation and conditions created in the experiment."<sup>134</sup> Since reconstructions are a replay of the conditions existing at the time of the event in question, proponents should have little difficulty meeting the standard. It is only when the reconstructionist takes liberties, such as introducing unknown variables or offering alternative theories, that courts will view the reconstruction as having independent probative value.<sup>135</sup> For instance, in *Lopez v. Foremost Paving, Inc.*,<sup>136</sup> which involved an accident reconstruction with toy trucks, the court found "that where the reenactment did not demonstrate the fog on the road or other conditions that had been present during the accident that gave rise to the litigation, the evidence should be excluded."<sup>137</sup> The court stated, "[t]he producers of the video made no attempt to portray the fog or the darkness in which the accident actually occurred."<sup>138</sup>

Similarly, in Arizona, an appellate court recently determined that the plaintiff did not meet the minimum foundational requirements to have his computer simulation entered into evidence.<sup>139</sup> In *Bledsoe*, the plaintiff, Joseph Bledsoe, sought to introduce into evidence a computer re-creation of his accident.<sup>140</sup> During an early morning bicycle ride, Bledsoe struck a cable gate on one of the Salt River Valley Water User's Association's (SRP) private dirt roads.<sup>141</sup> In an attempt to warn the public, which also traveled the roads, SRP had placed an orange and white reflector on the gate.<sup>142</sup> Bledsoe maintained that the early morning conditions prevented him from seeing the reflector.<sup>143</sup> Even though the trial court admitted the computer re-creation of the event in question, the appellate court disagreed with its admission.<sup>144</sup> The court held that the reconstruction did not even meet the minimum foundational requirements because it was not similar to the actual accident.<sup>145</sup> The court found that the videotape reenactment included the expert's opinion as to "how the accident happened, the location of lighted and darkened areas at the time,

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133. *Id.*

134. *Lopez v. Foremost Paving, Inc.*, 796 S.W.2d 473, 480 (Tex. Ct. App. 1990). *See also* *Bledsoe v. Salt River Valley Water Users' Ass'n*, 880 P.2d 689 (Ariz. Ct. App. 1994). *See generally* Lee & Pirozzolo, *supra* note 23.

135. Lee & Pirozzolo, *supra* note 23, at 191.

136. 796 S.W.2d 473.

137. *Id.* at 795. *See also* *Lopez*, 796 S.W.2d at 480.

138. *Lopez*, 796 S.W.2d at 480.

139. *Bledsoe v. Salt River Valley Water User's Ass'n*, 880 P.2d 689, 692-93 (Ariz. Ct. App. 1994).

140. *Id.* at 692.

141. *Id.* at 690.

142. *Id.*

143. *Id.* at 690-91.

144. *Id.* at 693.

145. *Id.* at 692-93.

and the effect of alternate or additional lighting.”<sup>146</sup> The court also found fault with plaintiff’s failure to provide opposing counsel with the evidence in enough time to prepare an adequate cross-examination.<sup>147</sup>

Some courts refuse to recognize that the numerous variables involved in computer evidence are even remotely akin to reality.<sup>148</sup> In *Richardson v. State Highway & Transportation Commission*,<sup>149</sup> the Missouri Supreme Court refused to allow defendants to introduce a computer simulation of an automobile accident to prove that the vehicle in question could not have hydroplaned.<sup>150</sup> Although the court viewed the reconstruction as experimental evidence and admissible upon a threshold showing of substantial similarity, it refused to admit the reconstruction.<sup>151</sup> The court reasoned that the underlying facts of the simulation were not reasonably certain, and any reconstruction would not adequately compare to the actual event.<sup>152</sup> As in *Bledsoe*, the court noted disapprovingly that the plaintiffs gave defense counsel inadequate time to prepare for the reconstruction.<sup>153</sup>

### C. Prejudicial Influence on the Jury

Perhaps the most formidable obstacle faced by the proponent of a computer re-creation is the balancing process required by Rule 403 of the Federal Rules of Evidence.<sup>154</sup> Although courts may exclude a reconstruction because it unfairly aids one party or it presents inherent classification problems, their primary concern seems to be the risk that juries will confuse issues and afford too much weight to the computer re-creation.<sup>155</sup> In *Sommervold v. Grevlos*,<sup>156</sup> the Supreme Court of South Dakota refused to overrule the trial court’s decision to exclude a computer re-creation of a bicycle accident.<sup>157</sup> The court found that the trial judge was correct in determining that the re-creation was not sufficiently similar to the actual events in question, and therefore, the re-creation was not admissible.<sup>158</sup> Because a “video recreation of an accident . . . stands out in the jury’s mind,” it may force jurors to place more weight on

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146. *Id.* at 692.

147. *Id.*

148. *See, e.g., Richardson v. State Highway & Transp. Comm’n*, 863 S.W.2d 876 (Mo. 1993).

149. *Id.*

150. *Id.* at 881-82.

151. *Id.* at 882.

152. *Id.*

153. *Id.*

154. FED. R. EVID. 403. The rule states: “Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury.” *Id.*

155. *Commonwealth v. Klinghoffer*, 564 A.2d 1240, 1242 (Pa. 1989) (Larsen, J., dissenting) (noting that the computer “presents a real danger of being the vehicle of introducing erroneous, misleading, or unreliable evidence”) (quoting *Perma Research & Dev. v. Singer Co.*, 542 F.2d 111, 124-26 (2d Cir. 1976)).

156. 518 N.W.2d 733 (S.D. 1994).

157. *Id.* at 738.

158. *Id.*



the re-creation, rather than on the spoken testimony.<sup>159</sup> The expert reconstructionist in *Pierce* summarized the effect of a computer reconstruction on a jury, by recalling the jury's reaction to his re-creation: "All eyes were glued to the set."<sup>160</sup> Even these limitations placed on admissibility by Rule 403 do not usually preclude trial judges from determining that the probative value of simulations outweighs the prejudicial danger, provided that the parties have met the other admissibility requirements.

#### IV. THE RECONSTRUCTION AS DEMONSTRATIVE EVIDENCE: THE ADVANTAGES OF A LOWER STANDARD OF ADMISSIBILITY

After reviewing the classifications of computer-generated evidence and the standards for admissibility, it appears that accident reconstructions and crime scene reenactments are most similar to computer animations and should be admissible under the standards for demonstrative evidence. Because computer simulations offer alternative theories of actual events, they draw independent conclusions. For this reason, they are usually admissible only after an expert witness verifies the accuracy of the computer program and the underlying data which support his conclusion. An accident reconstruction or crime scene reenactment, however, is an explanation of what happened.<sup>161</sup> The reconstructionist derives facts from the investigation and enters these into a computer, which supplies the missing information. Like computer animation, accident reconstruction illustrates the relevant evidence.<sup>162</sup> The reconstruction acts as a witness to the event, recounting a version of what happened. The computer reconstruction is highly probative, and furthers the jury's understanding of pertinent issues. Further, a computer reconstruction is easily admissible by the proponent's showing that it fairly and accurately portrays the event, without the need to verify the scientific validity of the underlying theories. If reconstructions meet these foundational requirements, courts should view more favorably the need for computer reconstructions as a valuable evidentiary tool.

##### *A. Jurors Will Adequately Weigh Reconstructions With Other Evidence*

Americans watch enormous amounts of television, and most households

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159. *Id.* (quoting the trial court).

160. *Using Computer Animation in the Courtroom*, *supra* note 22, at 20.

161. *Robinson v. Missouri Pac. R.R.*, 16 F.3d 1083, 1088 n.5 (10th Cir. 1994). The *Robinson* court cites to *Datskow* to distinguish the difference between accident re-creations and simulations. *Id.*; *Datskow v. Teledyne Continental Motors Aircraft Prods.*, 826 F. Supp. 677, 686 (W.D.N.Y. 1993). The court found that "it is the difference between a jury believing that they are seeing a repeat of the actual event and a jury understanding that they are seeing an illustration of someone else's *opinion* of what happened." *Robinson*, 16 F.3d at 1089 n.5 (quoting *Datskow*, 826 F. Supp. at 686). Since jurors can appropriately make this decision, there is no reason to exclude the re-creation from evidence. *Id.*

162. *Chatterjee*, *supra* note 28, at 39.



own one, if not several, VCRs.<sup>163</sup> Because of the increase in the number of hours of television the public consumes, the method in which society communicates has changed. For some, attention spans have become shorter, while others expect quick resolution to problems. While real life problems may not always be resolved within a thirty minute time span, as they are in a sitcom, television and computers do provide a quick method of providing information to large groups of people simultaneously. Jurors are used to watching television and videos, or playing computer games.<sup>164</sup> They feel comfortable receiving information through this medium.<sup>165</sup> Jurors now expect visual displays in the courtroom.

Recent studies prove "that juries remember 85 percent of what they see as opposed to only 15 percent of what they hear."<sup>166</sup> The visual nature of the computer reconstructions will increase these jurors' retention.<sup>167</sup> Since the entire jury views a reconstruction simultaneously, the jury becomes better equipped to reach a uniform decision.<sup>168</sup> One commentator argues, however, that jurors may not perceive the correct information or may not have adequate time for analysis of the individual components constituting the reconstruction.<sup>169</sup> Additionally, it has been argued that jurors will view the computers as the ultimate arbiter of truth and place an inordinate amount of weight on this one piece of evidence in reaching their verdict, while disregarding other crucial pieces of information.<sup>170</sup>

A demonstrative evidentiary standard would combine the important aspects of the verbal testimony with the visual displays. Jurors will receive explanations of the information, while cross-examination will safeguard against the undue influence of the reconstruction. Further, the affordability of computers has allowed potential jurors to have access to computers and knowledge of various programs. In the event a jury member does not have this exposure, a court's admission of the reconstruction as an illustration of expert testimony will enable the juror to receive an explanation of the basic concepts and the results of the reconstruction.

While the reliability of reconstruction programs negates many admissibility challenges, opponents currently find reassurance that the staggering cost of these re-creations prevents their frequent use. Prices often range from "\$1,000 to \$4,000 per second for a completed three dimensional

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163. "[B]y the time average high school students graduate, they have completed 11,000 hours of in-class work, yet have watched over 15,000 hours of television." Berkoff, *supra* note 45, at 846.

164. *Id.*

165. *Id.*

166. Chatterjee, *supra* note 28, at 43.

167. Berkoff, *supra* note 45, at 829-30.

168. *Id.*

169. Chatterjee, *supra* note 28, at 43.

170. Berkoff, *supra* note 45, at 846.

computer simulation.”<sup>171</sup> The vast amounts of detail and information involved in reconstructions sometimes make the final product extremely expensive compared to videotaped versions of events.

### *B. Reliability of Computer Programs*

Perhaps the best advantage of computer simulations is their ability to process large amounts of complex data into a concise form. Robert Anderson, an accident reconstructionist, better describes the process:

In reconstructing such an incident, you often start with the skid marks, estimating reaction time and where the brakes were first applied. You then examine damage to the vehicle and estimate the collision speed. In the computer you ‘build’ cars with precisely the same specifications as the cars involved in the incident and you ‘run’ them over and over again—braking, accelerating and steering them under various road conditions until you produce the most logical result.<sup>172</sup>

Anderson adds that this method is certainly preferable to having professional drivers crash into real cars some 500 times from various angles.<sup>173</sup> The court in *Commercial Union* agreed with the necessity of computers to synthesize complex data into a coherent, presentable form for the jury.<sup>174</sup> By allowing into evidence a computer simulation of steam consumption over a period of five years, the court recognized the ability of computers to “perform rapidly and accurately an extensive series of computations not readily accomplished without use of a computer.”<sup>175</sup> Increasingly, courts are recognizing that reconstructions can help to provide for more efficiency at trial.

Some critics argue that the computer program itself is unreliable.<sup>176</sup> One author suggests the problem lies in the numerous programs needed to run a simulation.<sup>177</sup> Advances in the field of accident reconstruction and widely used programs seem to allay these concerns. Programs such as AutoCAD,<sup>178</sup> allow the reconstructionist to enter the data and redraw the scene without switching to another computer program. Courts are beginning to move from a *Daubert* view of drafting programs as scientific inventions of mystery and awe toward

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171. *Id.* at 852.

172. *Computer Simulation May Be Considered Real Evidence*, *supra* note 22, at 17.

173. *Id.* at 21.

174. *Commercial Union Ins. Co. v. Boston Edison Co.*, 591 N.E.2d 165, 168 (Mass. 1992).

175. *Id.* The court further relied on *Schaeffer v. General Motors Corp.* which held that “[t]here is no reason to prevent [experts] from performing the same calculations, with far greater rapidity and accuracy, on a computer.” *Id.* (quoting *Schaeffer v. General Motors Corp.*, 372 Mass. 171, 177 (1977)).

176. See generally Chatterjee, *supra* note 28; Berkoff, *supra* note 45.

177. Chatterjee, *supra* note 28, at 42.

178. See generally *State v. Clark*, 655 N.E.2d 795, 801 (Ohio Ct. App.), *appeal dismissed*, 650 N.E.2d 1367 (Ohio 1995). AutoCAD retains 60% of the market share for use by reconstruction experts and engineers. *Id.* Automobile and aircraft manufacturers often use this computer program for product design and testing. *Id.* It is also used to construct buildings and bridges. *Id.*

the realization that these programs are tools, similar to calculators or adding machines, used everyday by professionals in their technical capacities.<sup>179</sup>

The argument to refuse admissibility turns then to the potential for human error. In other words, if an inaccuracy exists in the underlying data, it will translate into inaccuracies in the final product. In accident reconstruction cases, the reconstructionist begins by investigating the scene and gathering data from the accident. This data should include statements from eyewitnesses, photographs, scene visits and highway maps and surveys.<sup>180</sup> With incorrect data, the reconstructionist could accidentally misrepresent the scenario.<sup>181</sup> Alternatively, a reconstructionist could use technology to manipulate the facts and distort issues. Notwithstanding possible errors, courts still should allow these reconstructions to illustrate expert testimony. Jurors can better understand the subtleties involved within accidents after observing the scene from numerous angles or positions. The reconstruction moves the jury from actual testimony repeating skid mark measurements, to a visual display showing the car moving toward the accident site and suddenly applying its brakes to create skid marks. Computer reconstruction can help juries accurately gauge events and determine the appropriate weight to accord contrasting versions of events.

#### V. SUGGESTIONS FOR SUCCESSFUL ADMISSION OF COMPUTER RE-CREATIONS INTO EVIDENCE

##### A. Pre-Trial Disclosure of Re-creations

An advisory committee prominent in the promulgation of the Federal Rules of Civil Procedure underscored the necessity of advanced preparation to achieve a fair and impartial trial.<sup>182</sup> Additionally, the committee stated that "[e]ffective cross-examination of an expert witness requires advance preparation. The lawyer even with the help of his own experts frequently cannot anticipate the particular approach his adversary's expert will take . . ."<sup>183</sup> A recent cases suggests the difficulties a party faces when it fails to reveal computer reconstructions to opposing parties prior to trial. In *Richardson v.*

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179. The court in *Robinson v. Missouri Pac. R.R.* refused to explain an accident reconstruction in the terms of scientific evidence. 16 F.3d 1083, 1088 (10th Cir. 1994). The court held "it is outside scientific knowledge to opine in a crash such as this one that a car struck at an angle will necessarily leave the railroad tracks on impact." *Id.* at 1089.

180. See generally DeMaria, *supra* note 67.

181. *Commonwealth v. Klinghoffer*, 564 A.2d 1240, 1242 (Pa. 1989) (per curiam) (Larsen, J. dissenting). Although the appeal was dismissed, Justice Larsen wrote a scathing dissent regarding the improper use of animation. *Id.*

182. Mark Barrish, *Disclosure of Computer Re-enactments During Pretrial Discovery*, 16 HASTINGS COMM. & ENT. L.J. 691, 704-05 (1994).

183. *Id.* at 705.

*State Highway & Transportation Commission*,<sup>184</sup> the court noted that the defendants did not give notice of their intent to use a computer simulation until the last business day before trial.<sup>185</sup> The Missouri Supreme Court upheld the trial court's decision to refuse the introduction of the simulation into evidence due to the consequential limits on the plaintiff's ability to cross-examine effectively.<sup>186</sup> Similarly, the Supreme Court of Iowa essentially subscribed to the same theory used by the *Richardson* court.<sup>187</sup> In this case, the plaintiff argued that she did not receive advance notice of defendant's intent to use computer-generated diagrams of the accident scene.<sup>188</sup> While the court agreed with the plaintiff regarding the necessity for timely pre-trial disclosure, the record in this case revealed that the parties previously had agreed to proceed with discovery beyond the deadlines imposed by the scheduling order.<sup>189</sup> Without proper pre-trial disclosure, a party faces serious disadvantages in mounting an effective challenge to the illustration of the witness's testimony. To ensure the admission of the computer reconstruction, the proponent should adequately disclose the information to opposing counsel at least two weeks before trial to allow time to prepare an effective cross-examination.

#### *B. Effective Jury Instructions*

Courts, by giving limiting instructions, can address parties' concerns that juries will confuse the issues after viewing a computer re-creation. To be most effective, the judge should instruct the jury when the re-creation is admitted that the proponent is using it to illustrate expert testimony.<sup>190</sup> Additionally, the judge should clarify any assumptions relating to which version of the facts the reconstruction depicts.<sup>191</sup> If the court requires substantial similarity, the judge should also give instructions about apparent differences between the simulation and the actual scene, for example that the exhibit is not drawn to scale.<sup>192</sup> It should be noted that a trial judge's exclusion of parts of a reconstruction does not necessarily render the remainder unusable.

Even clear instructions may not erase the impact of the visual display in the minds of jurors. Sometimes juries misunderstand a judge's instructions about the appropriate weight to give new forms of evidence.<sup>193</sup> On the other hand,

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184. 863 S.W.2d 876 (Mo. 1993).

185. *Id.* at 882.

186. *Id.*

187. *Ladeburg v. Ray*, 508 N.W.2d 694 (Iowa 1993).

188. *Id.* at 695.

189. *Id.*

190. Gregory P. Joseph, *A Simplified Approach to Computer-Generated Evidence and Animations*, 156 F.R.D. 327, 335-36 (1994).

191. *Id.* at 336.

192. *Id.*

193. Chatterjee, *supra* note 28, at 44.



jurors are not naive about computers, and their familiarity with basic computer concepts should prevent unreasonable reliance on this evidence in arriving at the final verdict. Moreover, the judge in most cases engages in an independent review of the evidence before presenting it to the jury.<sup>194</sup> If the proponent wishes to use a computer reconstruction to illustrate expert testimony and lays the proper foundation, it is unlikely the trial judge will find that it unfairly prejudices jurors.<sup>195</sup>

#### IV. CONCLUSION

Courts are only beginning to realize the importance of admitting computer-generated evidence for a fair and efficient trial. Proponents of computer-generated evidence often rely on it for accident reconstruction. It has become a powerful evidentiary tool for turning sizeable amounts of complex data into comprehensible form. When used properly, computer reconstructions can provide greater understanding for the jury. Crime scene and accident reconstructions are not based on expert assumptions of events; instead, they are illustrations of what happened. For this reason, courts should reduce current obstacles to their admissibility. Any prejudicial effects of the reconstruction are outweighed by the ability of the jury to place appropriate weight on the evidence. Courts must learn to accept advances in technology, just as the public is beginning to obtain a better grasp of the basic fundamentals of computer operation. If courts are open to advances in technology, they become better able to reflect changes in society.

*Kristin L. Fulcher*

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194. *Robinson v. Missouri Pac. R.R.*, 16 F.3d 1083, 1089 (10th Cir. 1994) (noting the trial judge must make a preliminary assessment of the reasoning underlying the evidence).

195. *Id.* at 1088.