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Marc A. Ellenbogen

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NOTES

LIGHTS, CAMERA, ACTION: COMPUTER-ANIMATED EVIDENCE GETS ITS DAY IN COURT

Red flashes, representing bullets, shoot across the screen and through computer-generated images of victims.¹ A male model running through a parking lot is struck by a bullet while turning around with his arms in the air in surrender.² Such images represent examples of a new demonstrative aid that can be produced for trials with computer animation and videotape.³ The development of this technology permits attorneys to convert experts' ordinary, verbal testimony into dynamic, visual demonstrations capable of mentally transporting jurors to the scene of a crime to recreate an advocate's version of the events.⁴ Commentators believe that animations such as these will become increasingly prevalent in all trial areas.⁵

In 1985, lawyers for the United States made legal history by placing into substantive evidence⁶ a computer-animated videotape for the

¹ Rorie Sherman, *Moving Graphics*, NAT'L L.J., Apr. 6, 1992, at 1, 31 [hereinafter *Moving Graphics*].

² *Id.*

³ *Id.* See also William M. Bulkeley, *More Lawyers Use Animation To Sway Juries*, WALL ST. J., Aug. 18, 1982, at B1. Although the terms simulation and animation are often used interchangeably, the two concepts differ in one important respect. Robert B. Reagan, 1991 WL 330753 at *1. Traditionally, animations consisted of an image perceived on a video or television screen that had the characteristics of size, shape, color and motion. *Id.* Simulation, however, incorporates not only visible characteristics but also mathematical characteristics such as mass, velocity and acceleration consistent with the laws of physics. *Id.* Throughout this Note, the term animated video, or animation, will refer to all animations whether or not based upon computer simulations.

⁴ See Sherman, *Moving Graphics*, *supra* note 1, at 31.

⁵ *Id.*

⁶ Substantive evidence is "[t]hat adduced for the purpose of proving a fact in issue, as opposed to evidence given for the purpose of discrediting a witness . . . or of corroborating his testimony." BLACK'S LAW DICTIONARY 1429 (6th ed. 1990). In comparison, demonstrative evidence merely illustrates verbal testimony. *People v. Diaz*, 445 N.Y.S.2d 888, 889 (1981). Demonstrative evidence is admissible only if the item sufficiently explains or illustrates relevant testimony as to be of potential assistance to the trier of fact. *Pilkington v. Hendricks County Rural Elec. Co.*, 460 N.E.2d 1000, 1010 (Ind. Ct. App. 1984) (quoting MCCORMICK, EVIDENCE § 212 (1972)).

first time in a reported federal decision.⁷ Shortly thereafter, attorneys began to use computer-animated videotapes in civil cases involving toxic spills, building collapses, shipwrecks and other transportation accidents.⁸ Thus, admissibility into evidence, while not automatic, began to "enjoy precedent."⁹ Within the last few years, technological advances have brought animation within the budget of a large number of civil cases.¹⁰ As a result, the use of computer-animated videotapes in civil trials has become commonplace.¹¹

Commentators express concern about the potential problems that the use of computer-animated evidence poses in the context of criminal prosecutions.¹² Although computer animation may be appropriate in civil trials, according to one commentator, it is "extraordinarily prejudicial" in criminal cases.¹³ As a result, courts hold that because criminal defendants have a transcendent interest in the outcome of their trials, a stricter standard for the admissibility of computer-animated evidence must be used in criminal, as opposed to civil, cases.¹⁴

Critics of animation also contend that the use of such evidence transcends the bounds of the traditional rules of evidence.¹⁵ First, they suggest that animations constitute hearsay.¹⁶ Because animations do

Importantly, demonstrative evidence has no probative value beyond the testimony it illustrates. Roy Krieger, *Getting It Admitted*, A.B.A. J., Dec. 1992, at 96 [hereinafter Krieger, *Admitted*]. In addition, demonstrative evidence is not allowed to be viewed by the jury during its deliberation. *Id.* Thus, the usefulness of animated videotapes used as demonstrative evidence and the risks posed to their opponents are limited. *See id.* Consequently, animations are generally admissible as demonstrative evidence as long as a proper foundation is laid. Elaine M. Chaney, Note, *Computer Simulations: How They Can Be Used at Trial and the Arguments for Admissibility*, 19 IND. L. REV. 735, 742 (1986). Because the use of animations as demonstrative evidence is not generally controversial, this Note focuses on the admissibility of animations as *substantive* evidence.

⁷ Roy Krieger, *Now Showing at a Courtroom Near You*, A.B.A. J., Dec. 1992, at 92, 92-93 [hereinafter Krieger, *Now Showing*]. The trial, *Connors v. United States*, involved the August 2, 1985 crash of Delta flight 191 at Dallas/Ft. Worth Airport. *Id.* at 92; *see also* Paul Marcotte, *Animated Evidence: Delta 191 Crash Re-created Through Computer Simulations at Trial*, A.B.A. J., Dec. 1989, at 52, 52-56.

⁸ *Id.* at 93.

⁹ *Id.*

¹⁰ *Id.* The cost of computer-animated evidence has decreased dramatically in recent years. Thomas Brown, *Animation Adds A New Dimension*, NAT'L L.J., May 27, 1991, at 19. Only a few years ago, the average cost of a computer-animated videotape ranged from \$50,000 to \$100,000. *Id.* Today, special demonstrative evidence firms can create life-like videotapes at costs ranging from \$5,000 to \$40,000. *Id.*

¹¹ Sherman, *Moving Graphics*, *supra* note 1, at 1.

¹² *Id.* at 32. *See also infra* notes 149-85 and accompanying text for a discussion of the potential shortcomings of computer-animated evidence in criminal prosecutions.

¹³ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹⁴ *See* Speiser v. Randall, 357 U.S. 513, 525-26 (1958); *see also* United States v. Downing, 753 F.2d 1224, 1235-36 (3d Cir. 1985); New Jersey v. Johnson, 199 A.2d 809, 823 (1964).

¹⁵ Bulkeley, *supra* note 3, at B1.

¹⁶ *See infra* notes 288-93 and accompanying text.

not fit into any of the exceptions to the hearsay rule, they are, by definition, inadmissible.¹⁷ Second, commentators contend that the admission into evidence of a computer-animated videotape will often unfairly prejudice a criminal defendant, mislead the jury and constitute a cumulative presentation of evidence.¹⁸ Finally, the critics claim that animations often contain undetected inaccuracies.¹⁹ Advocates, on the other hand, claim that animations are the best way to clarify complex issues for jurors who are accustomed to receiving information from television.²⁰ The usefulness of the evidence, according to animations' advocates, overshadows any prejudicial impact that it might have upon a jury.²¹

The two conflicting views with respect to the computer-animated evidence have led to much recent debate over the admissibility of such evidence.²² This debate has been particularly fervent with respect to criminal prosecutions, where loss of life and liberty may be the cost of an improper decision as to admissibility.²³ Given the diminished cost of computer-animated evidence and the subsequent increase in its availability and use at trial, the time has come for legislatures to definitively address the issue of its admissibility at trial.²⁴

This Note analyzes the admissibility of computer-animated videotapes and concludes that the currently available standards of admissibility are inadequate to address the special problems posed by computer-animated evidence.²⁵ Section I examines the process used to produce computer-animated evidence and its uses at trial.²⁶ Section II describes the methods by which animated videos may be admitted into substantive evidence.²⁷ Section III examines the rule against hearsay under the Federal Rules of Evidence and the "catchall exception" to determine whether computer-animated evidence fits into this excep-

¹⁷ FED. R. EVID. 802.

¹⁸ See *infra* notes 151-85 and accompanying text.

¹⁹ See Jane B. Baird, *New From the Computer: 'Cartoons' for the Courtroom*, N.Y. TIMES, Sept. 6, 1992, at C5; Sherman, *Moving Graphics*, *supra* note 1, at 32; Fred Strasser, *The Video Verdict*, NAT'L L.J., June 23, 1986, at 1. See *infra* notes 82-84 and accompanying text for a discussion of a case involving inaccurate videotape evidence.

²⁰ See Bulkeley, *supra* note 3, at B1; Baird, *supra* note 19, at C5.

²¹ See Chaney, *supra* note 6, at 759; Bulkeley, *supra* note 3, at B1.

²² See Bulkeley, *supra* note 3, at B1.

²³ See Sherman, *Moving Graphics*, *supra* note 1, at 32.

²⁴ See Bulkeley, *supra* note 3, at B1; Sherman, *supra* note 1, at 32.

²⁵ See *infra* notes 279-305 and accompanying text. Although this Note discusses several civil cases that involved computer-animated evidence to illustrate how this evidence is used, this Note focuses on the admissibility of animated videos in criminal prosecutions because this is where the controversy exists.

²⁶ See *infra* notes 30-185 and accompanying text.

²⁷ See *infra* notes 186-248 and accompanying text.

tion.²⁸ Section IV analyzes the admissibility of computer-animated videotapes in criminal prosecutions and proposes an addition to the Federal Rules of Evidence in an effort to address the numerous problems surrounding the admissibility of such evidence.²⁹

I. THE PRODUCTION OF COMPUTER-ANIMATED EVIDENCE AND ITS USE AT TRIAL

Understanding what animation is, and how it is produced, are essential prerequisites to evaluating the reliability and accuracy of computer-animated evidence.³⁰ In addition, an examination of cases involving the admissibility of computer-animated evidence is useful as a means of assessing the potential shortcomings of such evidence.³¹ Finally, a review of commentators' criticisms of computer-animated evidence may elucidate some of the potential shortcomings of this form of evidence.³²

A. *Computer Animation: What Is It and How Is It Produced?*

In order to adequately assess the reliability and accuracy of computer-animated evidence, it is necessary to first understand what an animation is³³ and how it is produced.³⁴ The production process for computer-animated evidence consists of five steps.³⁵ These are: (1) creating the storyboard, (2) modeling, (3) animating, (4) rendering and (5) performing post-production processes.³⁶

The initial step in the production of an animation is the creation of the storyboard.³⁷ The storyboard is a script that describes how the animation's key elements are to be visually portrayed.³⁸ It describes the "flow and content" of the animation.³⁹ The storyboard consists of drawings and accompanying text that describe the content, movement,

²⁸ See *infra* notes 249-78 and accompanying text.

²⁹ See *infra* notes 279-306 and accompanying text.

³⁰ See Ian S. Jones et al., *Computer Animation: Admissibility in the Courtroom*, Forensic Tech. Int'l, at 4 (on file with *Boston College Law Review*).

³¹ See *infra* notes 69-148 and accompanying text.

³² See *infra* notes 149-85 and accompanying text.

³³ A computer generated animation is a series of still images created on a computer, which are subsequently recorded one at a time onto a videotape. Jones, *supra* note 30, at 1. When these still images are played back, the result is a moving picture or animation. *Id.* at 2.

³⁴ See *id.* at 4.

³⁵ *Id.* at 4-5.

³⁶ *Id.*

³⁷ *Id.* at 4.

³⁸ Jones, *supra* note 30, at 4.

³⁹ *Id.*

camera motion, viewpoints and colors that are to be used in the animation.⁴⁰ Legal commentators observe a great potential for danger in this phase of the production process because the writers of the script for the animation (both the animator and his or her client) have a vested interest in the outcome of the case.⁴¹

The second step in the production process is to create computer models of the objects that are to be depicted in the animation.⁴² Constructing the model is a two-step process.⁴³ First, the geometry of the objects is entered into the computer.⁴⁴ The second step is to assign the objects their crucial properties such as color, reflectivity and surface texture.⁴⁵ It is the addition of these properties that leads to the photorealistic quality of the resulting animation.⁴⁶

Once the storyboard and the models are completed, the creator essentially has a script and a set of actors.⁴⁷ The next step is creating the motion and adding cameras and lights to the litigants' alleged story.⁴⁸ Two methods exist for controlling the motion of the objects.⁴⁹ First, the animator can manually move the objects, camera and the lights within the scene.⁵⁰ When this method is used, the animator completely determines the motion of the objects.⁵¹ Alternatively, the motion may be generated by an external process such as through the output from a computer simulation or the calculations of an expert.⁵²

During the fourth step of production, the actual animated videotape is produced.⁵³ The animator, at this point, utilizes a computer to process data describing lighting conditions, camera positions, optical characteristics of the materials defining the objects and the geometry of the objects.⁵⁴ Then, the computer renders each still frame to create

⁴⁰ *Id.*

⁴¹ See Michael Kennedy, *Videos Are Dangerous To Justice*, at 1 (on file with *Boston College Law Review*); *Science and Technology Week* (CNN television broadcast, Feb. 29, 1992).

⁴² Jones, *supra* note 30, at 4. It is important to note that it is the animator, as directed by the client, who creates the models for the animation. See *id.*

⁴³ *Id.*

⁴⁴ *Id.* This is generally accomplished by breaking down complex objects so that they can be described by several simpler geometries such as planes, spheres or cubes. *Id.*

⁴⁵ *Id.*

⁴⁶ Jones, *supra* note 30, at 4.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ Jones, *supra* note 30, at 4.

⁵² *Id.*

⁵³ *Id.* at 5.

⁵⁴ *Id.*

photorealistic quality images.⁵⁵ Once all of the frames are rendered, these images are recorded on a videotape.⁵⁶ Finally, once the animator records the images on the videotape, the post-production processes are performed.⁵⁷ Importantly, once again, this phase of the production process enables an interested party to create "substantive evidence" for use at trial.⁵⁸ At this stage, the animator edits the videotape and may add special effects and text captions.⁵⁹

Once computer-animated evidence is created, the leading producers of such displays claim extraordinary success rates with respect to admissibility.⁶⁰ Forensic Technologies International has offered into evidence eighty of the more than five hundred animations it has created.⁶¹ The animations have been excluded in only two cases.⁶² A second producer of animations, Litigation Services, Inc., has offered 60 of its approximately 175 animations into evidence.⁶³ According to a spokesperson for Litigation Services, Inc., none of the company's animations have been excluded from evidence.⁶⁴ Finally, Legal Graphic Communicators, Inc., a third important competitor in a field that also includes dozens of smaller shops, has had all of its more than 100 animations admitted into evidence.⁶⁵

It is important to note that it is the creator of the animation, under the direction of his or her client (i.e., the litigant or his or her attorney), who carries out each of the five steps of production.⁶⁶ Commentators contend that because each of these parties has a vested interest in the outcome of the case, a strong incentive exists for these individuals to prepare animations in a biased fashion.⁶⁷ In addition, some commentators claim that the animation process mandates the use of speculation in order to create a continuous display and, as a result, will lead to the production of inaccurate evidence.⁶⁸

⁵⁵ *Id.*

⁵⁶ Jones, *supra* note 30, at 5.

⁵⁷ *Id.*

⁵⁸ See Sherman, *supra* note 1, at 32.

⁵⁹ Jones, *supra* note 30, at 5.

⁶⁰ See Roger Parloff, *Now Showing in a Courtroom Near You*, AM. LAW., May 1990, at 4, 10, 12. The statistics given by the firms do not indicate whether the animations were admitted as demonstrative or substantive evidence. See *id.*

⁶¹ *Id.* at 10.

⁶² *Id.*

⁶³ *Id.* at 12.

⁶⁴ *Id.*

⁶⁵ Parloff, *supra* note 60, at 12.

⁶⁶ See Sherman, *supra* note 1, at 32.

⁶⁷ See *id.*

⁶⁸ Sherman, *Moving Graphics*, *supra* note 1, at 32; see also *Science and Technology Week*, *supra* note 41.

B. Case Law Involving the Admissibility of Computer-Animated Evidence

Because the use of computer-animated evidence is a new technological development, there is not a highly developed body of case law in the area.⁶⁹ Furthermore, in the few cases published, judges have failed to state explicitly their reasoning regarding the admissibility of computer-animated evidence.⁷⁰ Nevertheless, an examination of cases involving the admissibility of computer-animated evidence is useful as a means of assessing the potential shortcomings of such evidence.⁷¹

In the 1989 case of *Testa v. Texaco*, the Superior Court of the State of Delaware admitted an animation that demonstrated how a vent pipe would have fallen under each of two alternative theories.⁷² In *Testa*, the plaintiff was injured when a vent pipe fell, striking him in the head.⁷³ After evaluating the motion of the falling pipe, an expert concluded that the collapse was caused by a failed weld rather than a rusted bolt.⁷⁴ Based on the expert's opinion, the plaintiff created an animation showing how the pipe would have fallen under each alternative.⁷⁵ The court held that the animation was admissible because it would help the jury to understand how the accident occurred.⁷⁶

Similarly, in the 1989 case of *Gonzales v. Astroworld*, the District Court of Texas allowed an animation of a roller coaster ride to be admitted into evidence.⁷⁷ In *Gonzales*, the plaintiff alleged that a roller coaster's inadequate upper body restraints led to the tearing of his artery and ultimately to his suffering a stroke.⁷⁸ The plaintiff ordered the preparation of a computer animation of the roller coaster, showing an android on the ride, and depicting with arrows the "g-forces" being exerted on a passenger's head.⁷⁹ The six-minute video was based en-

⁶⁹ When this Note went to publication, in the criminal context, the case of *People v. McHugh* was the only published case dealing with the admissibility of computer-animated evidence. 476 N.Y.S.2d 721 (N.Y. Sup. Ct. 1984). Further, because most cases in the civil context occurred in lower level state courts, these decisions were generally unavailable.

⁷⁰ See *McHugh*, 476 N.Y.S.2d at 722-23; D.W. Luczak et al., *Computer Animations: A Resource Manual for Litigators*, Forensic Tech. Int'l, 4:1-17 (1989) (on file with *Boston College Law Review*).

⁷¹ See *infra* notes 69-148 and accompanying text.

⁷² Luczak et al., *supra* note 70, at 4:8 (citing *Testa v. Texaco*, 87 CMR 72 (Del. Super. Ct. 1989)).

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Gonzales v. Astroworld*, 85-84362 (Tex. Dist. Ct. 1989). In this case, the defendant ultimately stipulated to the admissibility of the animation. Parloff, *supra* note 60, at 8.

⁷⁸ Parloff, *supra* note 60, at 8.

⁷⁹ *Id.*

tirely on data obtained from the defendant.⁸⁰ After the defendant viewed the animation, the case was settled in favor of the plaintiff.⁸¹

In another recent decision involving computer animation, the trial court admitted into evidence a videotape that purported to illustrate the line of sight of a pilot from the cockpit of an airplane.⁸² The video, however, was actually taken from the wrong angle.⁸³ Thus, it became necessary for the defense to create its own animation in order to expose the inaccuracy of the plaintiff's videotape.⁸⁴

In *Feaster v. New York City Transit Authority*, however, the New York Supreme Court held the defendant's animated videotapes inadmissible.⁸⁵ In this case, the plaintiff fell onto the subway tracks and was run over by a subway car.⁸⁶ As a result, part of his leg was amputated.⁸⁷ The trial court excluded the defendant's computer-generated video simulation of the accident.⁸⁸ On appeal, the Appellate Division of the Supreme Court affirmed, stating that the admissibility of the animated videotape should have been left to the sound discretion of the trial court.⁸⁹

In 1984, in *People v. McHugh*, the New York Supreme Court became the first court to allow the introduction of a computer-animated videotape in a criminal trial.⁹⁰ More specifically, in *McHugh*, the court held that no pre-trial *Frye* hearing was necessary to determine the admissibility of the evidence.⁹¹ The prosecution in this vehicular homicide case alleged that the defendant was drunk while driving his car at

⁸⁰ *Id.* The plaintiff obtained construction drawings of the roller coaster and accelerometer readings from the defendant. *Id.*

⁸¹ See Luczak et al., *supra* note 70, at 4:16.

⁸² Strasser, *supra* note 19, at 22. The secondary source from which the information about this unpublished opinion was obtained provides neither the name of the case nor the court in which it was tried. *Id.*

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ Parloff, *supra* note 60, at 10, 12.

⁸⁶ *Feaster v. New York Transit Auth.*, 568 N.Y.S.2d 380, 381 (N.Y. App. Div. 1991).

⁸⁷ *Id.*

⁸⁸ Parloff, *supra* note 60, at 10, 12.

⁸⁹ *Feaster*, 568 N.Y.S.2d at 381.

⁹⁰ 476 N.Y.S.2d 721, 722 (N.Y. Sup. Ct. 1984); Sherman, *Moving Graphics*, *supra* note 1, at 32. The case involved a vehicular homicide, and the animation depicted the motion of a car, not a person. See *id.*

⁹¹ *McHugh*, 476 N.Y.S.2d at 722. See *infra* notes 195-210 and accompanying text for a discussion of the *Frye* test and its applicability to computer animated evidence. In jurisdictions that have adopted the *Frye* standard, animated evidence must satisfy the traditional requirements of relevancy, accuracy, fairness and helpfulness, as well as be generally accepted within the relevant scientific community. Mark McCormick, *Scientific Evidence: Defining A New Approach to Admissibility*, 67 IOWA L. REV. 879, 882 (1982).

a speed of eighty miles per hour.⁹² As a result, according to the state, McHugh lost control of the vehicle, struck a wall and killed his four teenage passengers.⁹³

The defendant denied both intoxication and speeding.⁹⁴ Rather, McHugh claimed that the accident occurred when the poor weather conditions caused his car to swerve off the road and hit an uncovered, ground-level electrical box.⁹⁵ As a result, the defendant contended that his tire was ruptured, causing his car to spin into a concrete wall.⁹⁶ The defendant attempted to demonstrate his theory by a computer reenactment of his version of the accident.⁹⁷

Before trial, the District Attorney moved for a *Frye* hearing to determine whether the underlying computer program and its formulae, techniques and processes were generally accepted as accurate and reliable by the scientific community.⁹⁸ The New York Supreme Court held that no such pre-trial hearing was required.⁹⁹ The court ruled that as long as the defendant's counsel laid an adequate foundation and qualified the expert witness, the animation could be admitted at trial.¹⁰⁰ Further, the court explained that the District Attorney had the opportunity to conduct a voir dire examination after the animation was offered at trial.¹⁰¹ Therefore, the court held that a *Frye* hearing was not a prerequisite to the admission of computer-animated evidence.¹⁰²

Finally, the court concluded that the video presented in this case was admissible.¹⁰³ The court reasoned that the animation was not a scientific device, but was analogous to a simple chart or diagram.¹⁰⁴ The court found that because the videotape was relevant to a possible defense, fairly and accurately reflected the oral testimony to be offered and was an aid to the jury's understanding of the issue, a *Frye* hearing was unnecessary.¹⁰⁵

⁹² Luczak et al., *supra* note 70, at 4:1. The defendant, Michael McHugh, was charged with four counts of second degree manslaughter and driving while intoxicated. *McHugh*, 476 N.Y.S.2d at 722.

⁹³ Luczak et al., *supra* note 70, at 4:1.

⁹⁴ *McHugh*, 476 N.Y.S.2d at 722.

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ *McHugh*, 476 N.Y.S.2d at 722.

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

¹⁰² *See id.*

¹⁰³ *Id.*

¹⁰⁴ *McHugh*, 476 N.Y.S.2d at 722.

¹⁰⁵ *See id.*

In 1988, an Arizona Superior Court similarly considered whether an animated videotape ought to be admitted in a criminal prosecution.¹⁰⁶ In *Arizona v. Phillips*, the court held that the prosecution's animated videotape of a shooting was admissible evidence.¹⁰⁷ The defendant had contended that a gun allegedly used to shoot the victim was fired a significant distance from the victim.¹⁰⁸ Further, he claimed that as a result of his position at the time of the shooting, it was impossible for him to have shot the victim.¹⁰⁹ In an effort to refute the defendant's claims, the prosecution created an animation purportedly proving that the gun had been held against the victim's head when it was fired.¹¹⁰ The court allowed the animation into evidence.¹¹¹

In *State v. Rollins*, the Palm Beach Circuit Court excluded the defendant's computer-animated videotape from evidence.¹¹² In *Rollins*, two police officers had fallen over a curb while attempting to arrest a suspect.¹¹³ As a result, the prisoner, Robert Jewett, was "sandwiched" between the two officers and mortally wounded.¹¹⁴

The prosecution alleged that Officer Rollins was criminally at fault because he had his arm across Mr. Jewett's neck while standing behind him.¹¹⁵ The prosecution posited that when the three men fell, Officer Rollins killed Mr. Jewett by "snapping his neck."¹¹⁶ The defense, however, claimed that Officer Rollins' arm was around Mr. Jewett's chest and inadvertently slipped to Mr. Jewett's neck during the fall.¹¹⁷ The defense created a computer-animated videotape to depict its version of the events.¹¹⁸ The court ruled the evidence inadmissible.¹¹⁹

In the 1991 case of *New Jersey v. Spath*, the Superior Court of New Jersey held admissible the prosecution's animated videotape that pur-

¹⁰⁶ Sherman, *Moving Graphics*, *supra* note 1, at 32 (citing *Arizona v. Phillips*, 87-365 (Ariz. Super. Ct. 1988)).

¹⁰⁷ *See id.*

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *See* Sherman, *Moving Graphics*, *supra* note 1, at 32. The court's opinion in this case is unpublished; the secondary source seems to indicate that the court offered little reasoning for its decision. *See id.*

¹¹² *Id.* at 33.

¹¹³ *Id.*

¹¹⁴ *Id.* Officer Lee Rollins, wearing a steel-plated bullet proof vest, landed on the bottom of the pile. *Id.* Officer Glen Thurlon (6'4", 245 pounds) landed on top of Mr. Jewett. *Id.*

¹¹⁵ Sherman, *Moving Graphics*, *supra* note 1, at 33.

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Id.*

ported to recreate certain aspects of a murder.¹²⁰ On April 10, 1990, Police Officer Gary Spath fatally shot sixteen-year-old Philip Pannell.¹²¹ The officer claimed that he shot the youth "in self defense."¹²² More specifically, he alleged that Philip Pannell's left arm was down and it appeared as if he was reaching for his pocket, where a gun was subsequently found.¹²³

The prosecution argued that the shooting was criminally reckless because Philip Pannell's left arm was actually "raised in surrender."¹²⁴ The prosecution sought to introduce an animated video that showed a series of scenarios in which a light (representing the two bullets) hit a red coat (similar to the one worn by Philip Pannell) when models (representing Mr. Pannell) held their arms in various positions.¹²⁵ The animation was intended to show where the models' left arms had to be for the hole in the coat to coincide with the bullet wound on Pannell's back.¹²⁶

The defense vehemently objected to the admission of the video.¹²⁷ The defense lawyer claimed that the admission of the video was extremely dangerous and prejudicial.¹²⁸ He stated, "[t]he people that are offering it into evidence are the same people who produce it, direct it, and star in it. Then they get on the stand and critique it."¹²⁹ The judge, however, did not agree with the arguments of defense counsel.¹³⁰ As a result, he held that the animation was admissible.¹³¹

Similarly, in the 1992 case of *People v. Mitchell*, the Superior Court of Marin County, California admitted into evidence for the first time in a murder prosecution a computer-animated videotape.¹³² The prosecution alleged that the defendant, Jim Mitchell, killed his brother.¹³³

¹²⁰ Sherman, *Moving Graphics*, *supra* note 1, at 32 (citing *New Jersey v. Spath*, SGJ263903 (1991)). Although the judge held that the prosecution's video was admissible, at trial a live demonstration was used instead. *Id.*

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹²⁶ *Id.*

¹²⁷ *Id.*

¹²⁸ *Id.*

¹²⁹ *Id.*

¹³⁰ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹³¹ *Id.* Subsequently, the judge stated, "I thought in this particular case it would be invaluable to understand what the expert was testifying to." *Id.*

¹³² *Science and Technology Week*, *supra* note 41.

¹³³ Sherman, *Moving Graphics*, *supra* note 1, at 32 (citing *People v. Mitchell*, 12462 (Cal. Super. Ct. 1992)).

Jim Mitchell claimed that he "blacked out" and, thus, could remember no details of his brother's murder.¹³⁴

The prosecution created a one-minute animation to show that the victim's position and the timing of the murder proved the killing was a deliberate, premeditated act.¹³⁵ To create the animation, the prosecution used information from the autopsy and police reports and its own crime scene investigation.¹³⁶ The animation showed eight flashes representing bullets moving in time intervals across the screen through doors, walls and a figure representing the alleged murder victim.¹³⁷ Three flashes struck the body.¹³⁸ Next, the fatal bullet passed through the figure's right eye, thrusting it against the wall.¹³⁹ At that point, the figure slumped to the floor.¹⁴⁰ The judge required that the prosecution make several alterations to the animation before it was admitted into evidence.¹⁴¹ Specifically, in the original video, the robot representing the victim moved from the bedroom to the hallway with its arms at its side.¹⁴² Defense counsel objected to the figure's unthreatening stance because there was no evidence indicating the position of the victim's body at the time of the alleged murder.¹⁴³ The animation was subsequently modified.¹⁴⁴ Instead of the figure, a gray dot was used to depict the victim in the animation.¹⁴⁵

The defendant was found guilty of voluntary manslaughter.¹⁴⁶ Now on appeal, the defense in *Mitchell* claims that the video was "fundamentally dishonest."¹⁴⁷ In the defense counsel's opinion, video or computer images cannot effectively recreate the human gestures that are necessary for a jury in determining intent, motive, malice and "the level of complicity" in homicide.¹⁴⁸

¹³⁴ *Science and Technology Week*, *supra* note 41.

¹³⁵ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹³⁶ *Science and Technology Week*, *supra* note 41.

¹³⁷ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹³⁸ *Id.*

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ Sherman, *Moving Graphics*, *supra* note 1, at 33.

¹⁴² *Id.*

¹⁴³ *Id.* The defense claimed that the victim approached his brother with what appeared to be a gun in his hand. *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ *Science and Technology Week*, *supra* note 41; Sherman, *Moving Graphics*, *supra* note 1, at 32. He was, however, acquitted of first-degree manslaughter. *Id.*

¹⁴⁷ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹⁴⁸ *Id.*

C. Potential Shortcomings of Computer-Animated Evidence

The cases described in the preceding section have not gone uncriticized.¹⁴⁹ Many commentators have expressed serious concern over the lack of protection provided to the opponents of computer-animated evidence.¹⁵⁰ The two main criticisms of computer-animated evidence are that: (1) the flawed production process may lead to undetected inaccuracies in the animations; and (2) the use of computer-animated evidence will unfairly prejudice an opponent at trial and thereby mislead the jury.¹⁵¹

Commentators claim that the animation production process does not adequately protect litigants against inaccuracies in animations that are used against them.¹⁵² First, these critics point out that all parties involved with the production of an animation—the animator, the attorney, the expert witness and the party to the case—have a vested interest in the outcome of the case.¹⁵³ They assert that the individuals who are offering the animation into evidence are the same people who design it, create it and edit it.¹⁵⁴ These commentators claim, further, that it is the animator who then serves as an expert witness and critiques his or her own work.¹⁵⁵ Commentators thus conclude that a strong incentive exists for these interested parties to prepare computer-animated evidence in a biased fashion.¹⁵⁶

Next, commentators contend that the actual animation production process inevitably leads to inaccuracies in computer-animated evidence.¹⁵⁷ These critics believe that animators may “introduce speculation” in their effort to create a continuous display.¹⁵⁸ They also con-

¹⁴⁹ See Sherman, *Moving Graphics*, *supra* note 1, at 32–33; Kennedy, *supra* note 41, at 1–2; *Science and Technology Week*, *supra* note 41.

¹⁵⁰ See Sherman, *Moving Graphics*, *supra* note 1, at 32; Rorie Sherman, *Psychological Impact Is Unclear*, NAT'L L.J., April 6, 1992, at 33 [hereinafter, Sherman, *Impact*]; Kennedy, *supra* note 41, at 1–2; *Science and Technology Week*, *supra* note 41.

¹⁵¹ See Sherman, *Impact*, *supra* note 150, at 33; Kennedy, *supra* note 41, at 1–2; *Science and Technology Week*, *supra* note 41.

¹⁵² See Baird, *supra* note 19; Sherman, *Moving Graphics*, *supra* note 1, at 32; Strasser, *supra* note 19, at 1; Kennedy, *supra* note 41, at 1–2.

¹⁵³ See Sherman, *Moving Graphics*, *supra* note 1, at 32; Kennedy, *supra* note 41, at 1–2.

¹⁵⁴ Sherman, *Moving Graphics*, *supra* note 1, at 32; see also Kennedy, *supra* note 41, at 1–2.

¹⁵⁵ Sherman, *Moving Graphics*, *supra* note 1, at 32.

¹⁵⁶ See Kennedy, *supra* note 41, at 1–2.

¹⁵⁷ See Baird, *supra* note 19; Sherman, *Moving Graphics*, *supra* note 1, at 32; Strasser, *supra* note 19, at 1.

¹⁵⁸ Sherman, *Moving Graphics*, *supra* note 1, at 32; see also *Science and Technology Week*, *supra* note 41. For example, an animator may incorrectly assume the location of a victim's arms at the time of a murder. See Sherman, *Moving Graphics*, *supra* note 1, at 33.

tend that the animators will often make faulty assumptions about the evidence.¹⁵⁹ In addition, commentators also assert that because human beings actually enter the information into the computer, the possibility of human error is great.¹⁶⁰ Moreover, they maintain that video has the potential to distort images simply by its production technique.¹⁶¹ In other words, the output and the process are additional sources of error.¹⁶² Even Forensic Technologies International, one of the largest creators of computer-animated evidence, professes virtual certainty that computer animators' evidence will make errors that can significantly affect the outcome of cases.¹⁶³ Furthermore, critics assert that the danger presented by the various sources of inaccuracies in animated videotapes is amplified by the difficulty of discovering the errors and the tendency of human beings to believe that the animations constitute the truth.¹⁶⁴ Finally, some commentators believe that even if an animation is able to adequately replicate the linear motion of an object such as airplane or car, the production process is simply not sufficiently sophisticated to accurately recreate the movement of a human being.¹⁶⁵ Commentators thus conclude that the actual animation process inevitably leads to inaccuracies in computer-animated evidence.¹⁶⁶

The second major criticism of computer-animated evidence is that it unfairly prejudices an opponent at trial and misleads the jury.¹⁶⁷ Unfair prejudice is defined as "an undue tendency to suggest [the making of a] decision on an improper basis, commonly, though not necessarily, an emotional one."¹⁶⁸ Many lawyers fear the psychological

¹⁵⁹ *Science and Technology Week*, *supra* note 41.

¹⁶⁰ Baird, *supra* note 19; Parloff, *supra* note 60, at 8.

¹⁶¹ Strasser, *supra* note 19, at 1.

¹⁶² *See id.* at 1, 22.

¹⁶³ Forensic Tech. Int'l, *Challenging Computer-Based "Evidence"* (on file with *Boston College Law Review*). Forensic Technologies International contends,

[w]ith the same degree of certainty that you might predict death and taxes, you can be confident that human beings who put together the computer-based evidence for the other side have made mistakes—mistakes that could have an important impact on the outcome of your case.

Id.

¹⁶⁴ Kennedy, *supra* note 41, at 1–2; *Science and Technology Week*, *supra* note 41.

¹⁶⁵ Sherman, *Moving Pictures*, *supra* note 1, at 32; Kennedy, *supra* note 41, at 1–2. For example, it is impossible to know how a person's muscles reacted to a fall, or the exact location of a victim's arms at the time of a murder. *See* Sherman, *Moving Pictures*, *supra* note 1, at 32.

¹⁶⁶ *See* Baird, *supra* note 19, at 5; Sherman, *Moving Graphics*, *supra* note 1, at 32; Strasser, *supra* note 19, at 1.

¹⁶⁷ Sherman, *Impact*, *supra* note 150, at 33; *see also* Sherman, *Moving Graphics*, *supra* note 1, at 32; Kennedy, *supra* note 41, at 1–2; *Science and Technology Week*, *supra* note 41.

¹⁶⁸ FED. R. EVID. 403, advisory committee's note.

impact that computer-animated evidence will have on juries.¹⁶⁹ More specifically, lawyers are concerned that extraneous information in the animation might accidentally trigger juror biases and that the material might contain "subliminal messages."¹⁷⁰ Further, they contend that allowing the trier of fact to view an animation depicting a murder, or other crime, invites a verdict based upon emotion rather than objective fact.¹⁷¹

Similarly, commentators believe that computer-animated evidence tends to mislead juries.¹⁷² More specifically, they claim that the members of the jury may overestimate the value of computer-animated evidence.¹⁷³ These critics profess that the overestimation of the value of animated evidence stems from (1) the human ability to retain visual images more effectively than verbal statements, and (2) the tendency of humans to believe that what they see is the truth.¹⁷⁴

First, commentators claim that because individuals retain visual displays more effectively than verbal statements, jurors will overemphasize computer-animated evidence.¹⁷⁵ They maintain that visualization is the key ingredient in understanding.¹⁷⁶ In this view, they point out that neurophysiologists contend that one-third of the human brain is devoted exclusively to visual memory.¹⁷⁷ These commentators rely upon a study that concluded that the use of visual, as opposed to oral, presentations increase juror retention 100%.¹⁷⁸ Further, the study showed that juror retention increases 650% when combined visual and oral presentations are used instead of solely oral evidence.¹⁷⁹ Experts generally agree that information is far more memorable and persuasive when it comes in a moving, pictorial form.¹⁸⁰ Thus, some commentators

¹⁶⁹ Sherman, *Impact*, *supra* note 150, at 33.

¹⁷⁰ *Id.* The animation might, for example, contain subliminal messages that one litigant is at fault or simply is an evil person.

¹⁷¹ Kennedy, *supra* note 41, at 1-2; *see also* Gibson v. Gunn, 202 N.Y.S. 19, 20 (N.Y. App. Div. 1923) ("the moving pictures present a fertile field for exaggeration of any emotion or action . . ."), *aff'd on reh'g*, 202 N.Y.S. 927 (1924).

¹⁷² *See* Sherman, *Impact*, *supra* note 150, at 33; Kennedy, *supra* note 41, at 1-2; *Science and Technology Week*, *supra* note 41.

¹⁷³ *See Science and Technology Week*, *supra* note 41; Krieger, *Now Showing*, *supra* note 7, at 92; Kennedy, *supra* note 41, at 1-2.

¹⁷⁴ Krieger, *Now Showing*, *supra* note 7, at 92; Kennedy, *supra* note 41, at 1-2; *Science and Technology Week*, *supra* note 41.

¹⁷⁵ *See* Krieger, *Now Showing*, *supra* note 7, at 92; Kennedy, *supra* note 41, at 1-2; *Science and Technology Week*, *supra* note 41.

¹⁷⁶ Krieger, *Now Showing*, *supra* note 7, at 92.

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ *Id.*

¹⁸⁰ *See, e.g.*, Brown, *supra* note 10, at 19; *News* (CNN television broadcast, Oct. 12, 1992).

contend that there is a great danger that the presentation of computer-animated evidence will overshadow all other evidence presented in the case.¹⁸¹ These critics claim that, as a result, when the jury goes into the room to deliberate, the computer-animated evidence will be the only image that they remember.¹⁸²

Finally, critics assert that because animated evidence is such a powerful portrayal of "facts," jurors will not realize that the video is merely one party's account of the events.¹⁸³ In other words, they fear that juries may accept the animation as true rather than subjecting it to critical analysis.¹⁸⁴ Thus, these commentators believe that computer-animated evidence tends to mislead jurors.¹⁸⁵

II. POTENTIAL STANDARDS FOR ADMISSION OF EVIDENCE IN THE FORM OF ANIMATED VIDEOTAPES

In assessing the admissibility of computer-animated evidence, it is essential to examine the ability of current evidentiary standards to adequately protect the rights of the parties to a litigation.¹⁸⁶ Initially, for animated evidence to be admissible, an adequate foundation must be established.¹⁸⁷ The foundation should establish the trustworthiness of the data used to create the animation.¹⁸⁸ In addition, the foundation must ensure the reliability of all calculations and assumptions used in analyzing the underlying data.¹⁸⁹ Finally, the foundation must demonstrate the accuracy of (a) the input process; (b) the operation and capability of the computer and software; (c) the output process; (d) the medium used to reproduce the computer graphics for presentation at trial (i.e., the videotape); and (e) the final presentation itself.¹⁹⁰

Once an adequate foundation has been established, the proponent of the animated evidence must satisfy the applicable admissibility standard of evidence.¹⁹¹ Two potential standards exist for evaluating

¹⁸¹ *News*, *supra* note 180.

¹⁸² *Id.*

¹⁸³ *News*, *supra* note 180; Kennedy, *supra* note 41, at 1-2; *Science and Technology Week*, *supra* note 41.

¹⁸⁴ Kennedy, *supra* note 41, at 1-2; *see also News*, *supra* note 180; *Science and Technology Week*, *supra* note 41.

¹⁸⁵ *See Sherman, Impact*, *supra* note 150, at 33; Kennedy, *supra* note 41, at 1-2; *Science and Technology Week*, *supra* note 41.

¹⁸⁶ *See Chaney*, *supra* note 6, at 740-41; Krieger, *Admitted*, *supra* note 6, at 96.

¹⁸⁷ Krieger, *Admitted*, *supra* note 6, at 96.

¹⁸⁸ *Id.*

¹⁸⁹ *Id.*

¹⁹⁰ *Id.*

¹⁹¹ *Id.*; Chaney, *supra* note 6, at 740-41.

the admissibility of animated videotapes as substantive evidence: (1) the *Frye* standard of general acceptance in the relevant scientific community, and (2) the standard as stated in the codified rules of evidence.¹⁹² In jurisdictions that have adopted the *Frye* standard, animated evidence must satisfy the traditional requirements of relevancy, accuracy, fairness and helpfulness, as well as be generally accepted within the relevant scientific community.¹⁹³ Conversely, in jurisdictions adopting the Federal Rules of Evidence, requirements of authentication, relevancy, the balancing test of Federal Rule of Evidence 403 and expert testimony must all be satisfied.¹⁹⁴

A. *The Frye Standard of General Acceptance in the Relevant Scientific Community*

In the 1923 case of *Frye v. United States*, the United States Court of Appeals for the District of Columbia established the "general acceptance" standard for the admissibility of scientific evidence.¹⁹⁵ The appellant, Frye, was tried for murder, and sought to prove his innocence by introducing evidence of the results of a systolic blood pressure test, a predecessor to the modern polygraph test.¹⁹⁶ The court announced that in order for scientific evidence to be admissible, the proponent must establish that the evidence is generally accepted by the interested scientific community.¹⁹⁷ After enunciating this standard, the court determined that the systolic blood pressure test was not generally accepted among the physiological and psychological authorities.¹⁹⁸ Consequently, the results of the test were inadmissible.¹⁹⁹

Shortly after the *Frye* decision, many courts adopted the general acceptance standard.²⁰⁰ During the last two decades, however, the *Frye*

¹⁹² Chaney, *supra* note 6, at 740-41; Krieger, *Admitted*, *supra* note 6, at 96. See *infra* note 209 for a discussion of which jurisdictions have adopted the *Frye* standard and which have adopted the "relevancy approach." Throughout this Note, the phrase "relevancy approach" will be used to describe the admissibility standard for evidence under the Federal Rules of Evidence. In addition, the phrase "codified rules of evidence" will be used to refer to both the Federal Rules of Evidence and its state law equivalents. It is important to note that in all jurisdictions, attorneys may also attempt to admit an animation as demonstrative evidence to illustrate or clarify testimony to the trier of fact. See Chaney, *supra* note 6, at 742; see *supra* note 6 for a discussion of the common law principles of demonstrative evidence.

¹⁹³ Krieger, *Admitted*, *supra* note 6, at 96; McCormick, *supra* note 92, at 882.

¹⁹⁴ Krieger, *Admitted*, *supra* note 6, at 96; see also Chaney, *supra* note 6, at 753-54.

¹⁹⁵ 293 F. 1013, 1014 (1923).

¹⁹⁶ *Id.* at 1013-14.

¹⁹⁷ *Id.* at 1014.

¹⁹⁸ *Id.*

¹⁹⁹ *Id.*

²⁰⁰ McCormick, *supra* note 91, at 883. See, e.g., *Kaminski v. State*, 63 So. 2d 339, 340 (Fla.

standard has been subject to sustained attack.²⁰¹ Commentators have three primary criticisms of the *Frye* standard.²⁰² First, it is difficult to identify the relevant scientific field.²⁰³ Second, the vague nature of the phrase "general acceptance" makes the standard ambiguous.²⁰⁴ Third, critics contend that the *Frye* standard prevents reliable, relevant evidence from reaching the trier of fact.²⁰⁵ They claim that the *Frye* jurisdictions will inevitably lag behind technological advances, while their courts wait for novel scientific techniques to gain general acceptance.²⁰⁶ They claim, therefore, that *Frye* thwarts rather than promotes the search for truth.²⁰⁷

The recognized shortcomings of the *Frye* standard have resulted in a trend away from the *Frye* standard, toward the relevancy approach suggested by the Federal Rules of Evidence.²⁰⁸ Some jurisdictions, however, continue to use *Frye* as the admissibility standard for scientific evidence.²⁰⁹ In these jurisdictions, the proponent of scientific evidence must satisfy the traditional requirements of relevancy and helpfulness to the trier of fact, as well as the requirement that the scientific principle or technique be generally accepted in the scientific community.²¹⁰

1953); *Henderson v. State*, 230 P.2d 495, 502-05 (Okla. 1951), cert. denied, 342 U.S. 898 (1951); *Boece v. State*, 37 N.W.2d 593, 597 (Neb. 1949).

²⁰¹ McCormick, *supra* note 91, at 883, 885-86.

²⁰² Frederick B. Lacey, *Scientific Evidence*, 24 JURIMETRICS J. 254, 265 (1984); Chaney, *supra* note 6, at 747.

²⁰³ Chaney, *supra* note 6, at 747; Lacey, *supra* note 202, at 265.

²⁰⁴ Chaney, *supra* note 6, at 747; Lacey, *supra* note 202, at 265.

²⁰⁵ Edward J. Imwinkelreid, *A New Era in the Evolution of Scientific Evidence—A Primer on Evaluating the Weight of Scientific Evidence*, 23 WM. & MARY L. REV. 261, 265 (1981) [hereinafter Imwinkelreid, *Evolution*].

²⁰⁶ *Id.*; see also Lacey, *supra* note 202, at 265.

²⁰⁷ Chaney, *supra* note 6, at 748; Lacey, *supra* note 202, at 265.

²⁰⁸ Edward J. Imwinkelreid, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 100 MIL. L. REV. 99, 100 (1983) [hereinafter Imwinkelreid, *Juror Psychology*].

²⁰⁹ Reagan, *supra* note 3, at *1; see also Gregory P. Joseph, *Technology Brings New Legal Issues*, N.Y. L.J., July 27, 1992, at S2. As of July 27, 1992, thirty-seven states had enacted evidence codes, thirty-four of which were patterned after the Federal Rules of Evidence. *Id.* Alaska, Arizona, Arkansas, Colorado, Delaware, Florida, Hawaii, Idaho, Iowa, Louisiana, Maine, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin and Wyoming adopted codes very similar to the Federal Rules of Evidence. *Id.* at n.1. California, Kansas and New Jersey have distinct evidence codes based upon the 1953 version of the Uniform Rules of Evidence. *Id.*

²¹⁰ McCormick, *supra* note 91, at 882.

B. *The Admissibility Standard Under the Federal Rules of Evidence—The Relevancy Approach*

As noted above, there is a trend toward adoption of the Federal Rules of Evidence.²¹¹ Further, the Federal Rules of Evidence and their state law analogs are expected to eventually replace the *Frye* standard altogether.²¹² These rules require only that evidence comply with four general requirements to be admissible.²¹³ First, the proponent of such evidence must establish authentication under Federal Rules 901(a) and 901(b)(9).²¹⁴ Second, an attorney seeking admission of computer-animated evidence must demonstrate its relevancy under Rules 401 and 402.²¹⁵ Third, the proponent of the animation must satisfy the Rule 403 balancing test.²¹⁶ Specifically, for evidence to be admissible, the dangers of unfair prejudice, confusion of the issues and misleading the jury must not substantially outweigh the probative value of the evidence.²¹⁷ Finally, an attorney seeking admission of computer-animated evidence must satisfy Federal Rules of Evidence 702, 703, 704 and 705, which pertain to expert testimony.²¹⁸

All evidence must meet the minimum authentication requirements of Federal Rules of Evidence 901(a) and 901(b)(9).²¹⁹ Rule

²¹¹ Imwinkelreid, *Juror Psychology*, *supra* note 208, at 100.

²¹² Krieger, *Admitted*, *supra* note 6, at 96.

²¹³ *Id.* The relevancy approach holds novel scientific evidence to the same admissibility standard as other evidence. Reagan, *supra* note 3, at *5. Courts following this approach admit evidence as long as it is helpful to the trier of fact, irrespective of its general acceptance. *Id.* Advocates of the relevancy approach contend that the Federal Rules of Evidence implicitly overruled *Frye*. *Id.* Proponents of this view argue that the Federal Rules of Evidence have established an admissibility standard inconsistent with *Frye* by allowing scientific evidence to be deemed reliable and thus relevant under Rule 401 without regard to its general acceptance in the scientific community. *Id.*

²¹⁴ Chaney, *supra* note 6, at 753; Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 901(a) ("The requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims."); FED. R. EVID. 901(b)(9) ("By way of illustration only, and not by way of limitation, the following are examples of identification conforming with the requirements of this rule . . . (9) Process or system. Evidence describing a process or system used to produce a result and showing that the process or system produces an accurate result.").

²¹⁵ Chaney, *supra* note 6, at 753-54; Krieger, *Admitted*, *supra* note 6, at 96.

²¹⁶ Chaney, *supra* note 6, at 754; Krieger, *Admitted*, *supra* note 6, at 96.

²¹⁷ See FED. R. EVID. 403.

²¹⁸ Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 702-05.

²¹⁹ Randolph A. Bain & Cynthia A. King, Note, *Guidelines for the Admissibility of Evidence Generated By Computer For Purposes of Litigation*, 15 U.C. DAVIS L. REV. 951, 954-55 (1982).

901(a) declares that the authentication or identification requirement is satisfied by evidence supporting a finding that the evidence is what it purports to be.²²⁰ Rule 901(b)(9) explains how to meet the 901(a) requirements with respect to a process or system such as animation.²²¹ The requirement is satisfied by first establishing the inherent reliability of the system or process used to produce the animation, and then establishing the accuracy of its output.²²²

Another of the Federal Rules of Evidence involved in admitting computer-animated evidence is Rule 401, which sets out the basic relevancy standard.²²³ The rule provides that evidence is relevant when it has "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence."²²⁴ Relevance depends upon whether evidence is likely to promote the ascertainment of truth.²²⁵ Further, Federal Rule of Evidence 402 mandates that all relevant evidence is admissible unless a constitutional, statutory or court rule basis for exclusion exists.²²⁶ As a result, an animation that meets the 401 requirement is generally admissible as long as it meets the other requirements of the Federal Rules of Evidence.²²⁷

Yet another of the Federal Rules of Evidence involved in admitting computer-animated evidence is Rule 403.²²⁸ Federal Rule of Evidence 403 provides that 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 trier of fact.²²⁹ Rule 403 was created to prevent the admission of evidence with a tendency to suggest a decision on an improper basis, such as evidence that appeals to

²²⁰ FED. R. EVID. 901(a).

²²¹ Bain & King, *supra* note 219, at 954-55; FED. R. EVID. 901(b)(9).

²²² Krieger, *Admitted*, *supra* note 6, at 96.

²²³ FED. R. EVID. 401.

²²⁴ *Id.*

²²⁵ Chaney, *supra* note 6, at 754 (citing *United States v. Krulewitch*, 145 F.2d 76, 80 (2d Cir. 1944)).

²²⁶ FED. R. EVID. 402 ("All relevant evidence is admissible, except as otherwise provided by the Constitution of the United States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority. Evidence which is not relevant is not admissible.").

²²⁷ *See id.*; Chaney, *supra* note 6, at 754.

²²⁸ Krieger, *Admitted*, *supra* note 6, at 96.

²²⁹ *Id.*; FED. R. EVID. 403 ("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, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.").

jurors' sympathies, arouses their sense of horror, provokes their instincts to punish or otherwise causes them to base their decision on something other than the facts of the case.²³⁰ Thus, a court may exclude evidence when, after performing the Rule 403 balancing test, it decides that the "costs of the evidence outweigh its benefits."²³¹ Therefore, to be admissible, an animation must be fair, accurate and complete.²³² In addition, its length must not be excessive and it must be unlikely to delay or disrupt the trial.²³³

Finally, because computer-animated evidence may constitute expert testimony, the expert testimony requirements of the Federal Rules of Evidence—Rules 702, 703 and 705—must be satisfied.²³⁴ Federal Rule of Evidence 702 establishes that expert testimony "in the form of an opinion or otherwise" is admissible as long as it "will assist the trier of fact to understand the evidence or to determine a fact in issue."²³⁵ The language of Rule 702 permits expert testimony in a form other than traditional opinion.²³⁶ Rule 702 can serve as the means for the admissibility of computer animations irrespective of whether the video expresses expert conclusions or merely illustrates the basis of opinion testimony by experts.²³⁷

Rule 702 is constrained by the Rule 703 requirement of a reliable basis for the opinion of an expert.²³⁸ Rule 703 states that facts not admissible as evidence, but upon which an expert bases an opinion, must be "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject."²³⁹ As a result, the opinion of the proponent of computer-animated evidence must be based upon facts reasonably relied upon by experts in the field of computer animation.²⁴⁰

²³⁰ JACK B. WEINSTEIN & MARGARET A. BERGER, WEINSTEIN'S EVIDENCE at 403-13, n.12 (1985).

²³¹ Chaney, *supra* note 6, at 754 (citing *United States v. Mangiameli*, 668 F.2d 1172, 1176 (10th Cir. 1982), *cert. denied*, 456 U.S. 918 (1982)).

²³² Krieger, *Admitted*, *supra* note 6, at 96.

²³³ *Id.*

²³⁴ *Id.*

²³⁵ Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 702 ("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.").

²³⁶ Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 702.

²³⁷ Krieger, *Admitted*, *supra* note 6, at 96.

²³⁸ *Id.*; FED. R. EVID. 703.

²³⁹ Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 703.

²⁴⁰ *See* Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 703.

Testimony by an expert witness that satisfies Rules 702, 703 and 705²⁴¹ remains admissible even if it addresses an ultimate issue to be decided by the trier of fact.²⁴² Specifically, Rule 704 prohibits the exclusion of opinions and inferences on ultimate issues on that basis alone.²⁴³ As a result, animated videotapes that are otherwise admissible remain admissible even if they conclusively depict an ultimate issue in dispute.²⁴⁴

In sum, once an adequate foundation has been established, the proponent of computer-animated evidence must satisfy the applicable admissibility standard of evidence—the *Frye* standard of general acceptance in the relevant scientific community, or the standard as enunciated in the codified rules of evidence.²⁴⁵ In jurisdictions that have adopted the *Frye* standard, animated evidence must satisfy the traditional requirements of relevancy, accuracy, fairness and helpfulness, as well as be generally accepted within the relevant scientific community.²⁴⁶ Conversely, in jurisdictions adopting the Federal Rules of Evidence, requirements of authentication, relevancy, expert testimony and the balancing test of Federal Rule of Evidence 403 must all be satisfied.²⁴⁷ Nevertheless, even after an adequate foundation is established and the applicable admissibility standard of evidence is satisfied, one hurdle remains—the hearsay rule.²⁴⁸

III. THE HEARSAY RULE AND THE "CATCHALL EXCEPTION"

A common objection to the admission of computer-animated evidence is that the videotape constitutes hearsay.²⁴⁹ If this objection is valid, then the animation must fit within an exception to the hearsay

²⁴¹ Rule 705 provides that, "The expert may . . . be required to disclose the underlying facts or data on cross-examination." FED. R. EVID. 705. Thus, Rule 705 makes available the opportunity for opposing counsel to expose expert witnesses to vigorous inquiry or cross-examination. Krieger, *Admitted*, *supra* note 6, at 96; *see also* FED. R. EVID. 705. Therefore, Federal Rule of Evidence 705 also serves to increase the reliability of expert testimony. Krieger, *Admitted*, *supra* note 6, at 96; *see also* FED. R. EVID. 705.

²⁴² Krieger, *Admitted*, *supra* note 6, at 96; FED. R. EVID. 704.

²⁴³ FED. R. EVID. 704 ("[T]estimony in the form of an opinion or inference otherwise admissible is not objectionable because it embraces an ultimate issue to be decided by the trier of fact.").

²⁴⁴ Krieger, *Admitted*, *supra* note 6, at 96; *see also* FED. R. EVID. 704.

²⁴⁵ Chaney, *supra* note 6, at 740-41; Krieger, *Admitted*, *supra* note 6, at 96.

²⁴⁶ McCormick, *supra* note 91, at 882.

²⁴⁷ Chaney, *supra* note 6, at 753-54; Krieger, *Admitted*, *supra* note 6, at 96.

²⁴⁸ *See infra* notes 249-78 and accompanying text for a discussion of the hearsay rule.

²⁴⁹ *See* Jerome J. Roberts, *A Practitioner's Primer on Computer-Generated Evidence*, 41 U. CHI. L. REV. 254, 272 (1974). *See infra* notes 253-56 and accompanying text for a discussion of the Federal Rules of Evidence hearsay provisions.

rule in order to be admissible as evidence.²⁵⁰ To assess this objection adequately, it is necessary first to examine the hearsay rule and any potentially applicable exceptions.²⁵¹

Hearsay is "a statement,²⁵² other than one made by the declarant while testifying at the trial or hearing, offered in evidence to prove the truth of the matter asserted."²⁵³ The Federal Rules of Evidence generally exclude hearsay evidence.²⁵⁴ This general rule, however, is subject to numerous exceptions under circumstances alleged to furnish guarantees of trustworthiness.²⁵⁵ An important test in determining whether testimony is hearsay is whether it is subject to cross-examination through the witness who verifies it.²⁵⁶

In addition to the numerous specific exceptions to the hearsay rule, the Federal Rules of Evidence provide two "residual" or "catchall" exceptions—Rule 803(24)²⁵⁷ and Rule 804(b)(5).²⁵⁸ The language of the two provisions is identical.²⁵⁹ These residual clauses provide for the

²⁵⁰ See Roberts, *supra* note 249, at 272; see also FED. R. EVID. 802 ("Hearsay is not admissible except as provided by these rules or by other rules prescribed by the Supreme Court pursuant to statutory authority or by Act of Congress.").

²⁵¹ See Roberts, *supra* note 249, at 272. Hearsay analysis under common law is similar to the analysis under the Federal Rules of Evidence. See 2 MCCORMICK ON EVIDENCE 97 (John William Strong ed., 1992). As a result, although the discussion refers to the hearsay analysis under the Federal Rules of Evidence, the same analysis is applied in all jurisdictions. See *id.*

²⁵² "A 'statement' is (1) an oral or written assertion or (2) nonverbal conduct of a person, if it is intended by the person as an assertion." FED. R. EVID. 801(a).

²⁵³ FED. R. EVID. 801(c). Demonstrative, as opposed to substantive, evidence is not included in the definition of hearsay. Chaney, *supra* note 6, at 756; see also FED. R. EVID. 801(c). More specifically, animations offered as demonstrative evidence are not offered to prove "the truth of the matter asserted." Chaney, *supra* note 6, at 756; see also FED. R. EVID. 801(c). As a result, they do not constitute hearsay. Chaney, *supra* note 6, at 756. Thus, when admitting computer-animated evidence as demonstrative evidence, the hearsay objection is inapplicable. See Chaney, *supra* note 6, at 756.

²⁵⁴ FED. R. EVID. 802.

²⁵⁵ See, e.g., FED. R. EVID. 801, 803–04. These exceptions, however, simply fail to encompass computer-animated evidence. See FED. R. EVID. 801(d), 803–04.

²⁵⁶ Richardson v. Missouri-K.-T. R. Co., 205 S.W.2d 819, 823 (Tex. Ct. App. 1947); Pierre R. Paradis, *The Celluloid Witness*, 37 U. COLO. L. REV. 235, 262 (1965).

²⁵⁷ FED. R. EVID. 803(24). Rule 803(24) applies even in circumstances where the declarant is available to testify. *Id.*

²⁵⁸ FED. R. EVID. 804(b)(5). Rule 804(b)(5) only applies when the declarant is unavailable to testify. FED. R. EVID. 804.

²⁵⁹ Compare FED. R. EVID. 804(b)(5) ("A statement not specifically covered by any of the foregoing exceptions but having equivalent circumstantial guarantees of trustworthiness, if the court determines that (A) the statement is offered as evidence of a material fact; (B) the statement is more probative on the point for which it is offered than any other evidence which the proponent can procure through reasonable efforts; and (C) the general purposes of these rules and the interests of justice will best be served by admission of the statement into evidence.") with FED. R. EVID. 803(24) ("A statement not specifically covered by any of the foregoing exceptions but having equivalent circumstantial guarantees of trustworthiness, if the court determines that

admission of hearsay evidence even where the evidence does not fall within one of the enumerated exceptions as long as certain conditions are satisfied.²⁶⁰ In essence, the catchall exceptions provide that a statement is admissible if its proponent satisfies certain threshold criteria and demonstrates that the evidence has "circumstantial guarantees of trustworthiness" equivalent to the enumerated exceptions.²⁶¹

The catchall exceptions provided by Federal Rules 804(b)(5) and 803(24) were not intended to create broad, new hearsay exceptions.²⁶² Rather, Congress intended that the exceptions be used extremely sparingly and only in "exceptional circumstances."²⁶³ The rules were designed to fill in omissions of other exceptions and to allow for the development of new general exceptions to the rule.²⁶⁴ Thus, although the catchall exceptions give federal courts the discretionary power to admit hearsay evidence, their discretion is not unfettered.²⁶⁵ Further, hearsay not within an enumerated exception is "presumptively unreliable," and the burden of overcoming that presumption falls on the party attempting to introduce the evidence.²⁶⁶

(A) the statement is offered as evidence of a material fact; (B) the statement is more probative on the point for which it is offered than any other evidence which the proponent can procure through reasonable efforts; and (C) the general purposes of these rules and the interests of justice will best be served by admission of the statement into evidence.").

²⁶⁰ FED. R. EVID. 803(24), 804(b)(5). It is important to note that in criminal cases the confrontation clause of the Sixth Amendment might exclude hearsay evidence that would otherwise be admissible under 803(24) of the Federal Rules of Evidence. Michael A. DiSabatino, Annotation, *Admissibility of Statement Under Rule 803(24) of Federal Rule of Evidence, Providing for Admissibility of Hearsay Statement Not Covered By Any Specific Exception But Having Equivalent Circumstantial Guarantees of Trustworthiness*, 36 A.L.R. Fed. 742, 746 (1978); see also U.S. CONST. amend. VI.

²⁶¹ See FED. R. EVID. 803(24), 804(b)(5). The threshold requirements of Federal Rules of Evidence 803(24) and 804(b)(5) are (1) sufficient notice must be given to the opponent of the evidence; (2) the statement must be offered as evidence of a material fact; (3) the statement must be more probative on the point for which it was offered than any other evidence which the proponent can reasonably procure and (4) the general purposes of these rules and the interests of justice must best be served by admission of the statement into evidence." FED. R. EVID. 803(24), 804(b)(5).

The purpose of the Federal Rules of Evidence are enunciated in Rule 102, which states, in relevant part, "[t]hese rules shall be construed to secure fairness in administration, elimination of unjustifiable expense and delay, and promotion of growth and development of the law of evidence to the end that the truth may be ascertained and proceedings justly determined." FED. R. EVID. 102.

²⁶² See *United States v. Calkins*, 906 F.2d 1240, 1245 (8th Cir. 1990) ("[a] review of the legislative history to this Rule reveals Congress' intention that the Rule be limited in scope and narrow in focus."); DiSabatino, *supra* note 260, at 762.

²⁶³ *United States v. Love*, 592 F.2d 1022, 1026 (8th Cir. 1979).

²⁶⁴ *United States v. Mandel*, 591 F.2d 1347, 1368 (4th Cir. 1979).

²⁶⁵ *Id.*

²⁶⁶ *Doe v. United States*, 976 F.2d 1071, 1079 (7th Cir. 1992).

In 1977, in *Grimes v. Employers Mutual Liability Insurance Co.*, the United States District Court for the District of Alaska held that the admission of hearsay evidence in the form of a film showing assertive conduct was admissible under Federal Rule of Evidence 803(24), where the facts indicated that normal hearsay problems did not exist or could be corrected.²⁶⁷ The lawsuit was for personal injuries arising out of an industrial accident.²⁶⁸ The plaintiff offered into evidence a film demonstrating his daily routine including the performance of two clinical tests.²⁶⁹ The court found that the film was, by definition, hearsay.²⁷⁰ The court, however, admitted the film under Rule 803(24) to communicate the nature and extent of the plaintiff's injuries.²⁷¹ The court reasoned that the film would allow the jury to consider evidence that was more probative than any other evidence that the plaintiff could reasonably procure on the material issues of pain and suffering and loss of enjoyments of life.²⁷² The court also believed that guarantees of trustworthiness existed, as the plaintiff-actor and the verifying witness were both subject to cross-examination.²⁷³ Further, the court noted that the plaintiff gave the defendant ample notice of his intention so that the defendant could adequately prepare his opposition.²⁷⁴ The court concluded that use of the catchall exception was justified here, as it is in all cases where ordinary hearsay problems do not exist or can be adequately remedied.²⁷⁵

In sum, if computer-animated evidence is deemed to constitute hearsay, it must fit into one of the hearsay exceptions in order to be admissible into evidence.²⁷⁶ The only exception that might plausibly encompass computer-animated evidence is the catchall exception.²⁷⁷ Thus, if computer-animated evidence constitutes hearsay, for it to be admissible into evidence, its proponent must demonstrate that the

²⁶⁷ 73 F.R.D. 607, 611 (D.C. Alaska, 1977).

²⁶⁸ *Id.* at 608.

²⁶⁹ *Id.* at 608-09. One section of the film showed the plaintiff performing the Jebesen-Taylor Hand Function Test and a range-of-motion, prosthetic device test. *Id.* at 609.

²⁷⁰ *Id.* at 611.

²⁷¹ *Id.* at 612.

²⁷² *Grimes*, 73 F.R.D. at 611.

²⁷³ *Id.*

²⁷⁴ *Id.*

²⁷⁵ *Id.* More specifically, the court reasoned that, in this case, no problems with perception, memory or meaning existed. *Id.* In addition, no sincerity problems existed because the verifying witness and the plaintiff-actor were subject to cross-examination. *Id.*

²⁷⁶ See FED. R. EVID. 802.

²⁷⁷ See, e.g., FED. R. EVID. 801-05.

evidence has "circumstantial guarantees of trustworthiness" equivalent to the enumerated exceptions and the threshold criteria are satisfied.²⁷⁸

IV. ARGUMENTS UNDER CURRENT LAW AGAINST THE ADMISSIBILITY OF COMPUTER-ANIMATED EVIDENCE AND A PROPOSAL TO MITIGATE THE UNCERTAINTY SURROUNDING THE ADMISSIBILITY OF SUCH EVIDENCE

In jurisdictions that have adopted the *Frye* standard, computer-animated evidence may be declared inadmissible on two separate grounds.²⁷⁹ First, computer-animated evidence is not generally accepted by the relevant community.²⁸⁰ Second, computer-animated evidence constitutes inadmissible hearsay.²⁸¹ In addition, in jurisdictions that have adopted the Federal Rules of Evidence or an equivalent set of evidentiary rules, computer-animated evidence may be declared inadmissible on two grounds. First, as in *Frye* jurisdictions, computer-animated evidence constitutes inadmissible hearsay.²⁸² Second, computer-animated evidence is inadmissible under the balancing test of Federal Rule of Evidence 403.²⁸³ Finally, the currently unaddressed complexities inherent in the admission of computer-animated evidence warrant an amendment to the Federal Rules of Evidence.²⁸⁴ Even those jurisdictions that continue to follow *Frye* should adopt such a new rule.

A. *Inadmissibility of Computer-Animated Evidence In Frye Jurisdictions Due To Lack of General Acceptance*

In jurisdictions that have adopted the *Frye* standard, computer-animated evidence is inadmissible because it is not generally accepted as accurate and reliable by the relevant community.²⁸⁵ As previously

²⁷⁸ See FED. R. EVID. 803(24), 804(b)(5). See *supra* note 261 for a discussion of the threshold criterion for admissibility under the catchall exception.

²⁷⁹ See *infra* notes 285–320 and accompanying text. It is important to note that the relevancy and helpfulness requirements do not prevent computer-animated evidence from gaining admissibility. This is because computer-animated evidence will provide the trier of fact with additional information from which to make a judgment. Because the relevancy and helpfulness standards are easily surmounted, the *Frye* standard fails to adequately protect the opponents of such evidence.

²⁸⁰ See *infra* notes 285–87 and accompanying text.

²⁸¹ See *infra* notes 288–93 and accompanying text.

²⁸² *Id.*

²⁸³ See *infra* notes 294–301 and accompanying text.

²⁸⁴ See *infra* notes 302–06 and accompanying text.

²⁸⁵ See Kennedy, *supra* note 41, at 1–2; Sherman, *Moving Graphics*, *supra* note 1, at 32; Strasser, *supra* note 19, at 1.

stated, there is currently great debate among legal scholars and animators as to the reliability and accuracy of such evidence.²⁸⁶ Specifically, some commentators claim that the flawed production process may lead to undetected inaccuracies in computer-animated evidence and that a strong incentive exists for the creators of computer-animated evidence to prepare such evidence in a biased manner.²⁸⁷ Thus, computer-animated evidence is not generally accepted as accurate and reliable by the relevant community. Therefore, in *Frye* jurisdictions, computer-animated evidence must be declared inadmissible.

*B. Hearsay as an Argument Against the Admissibility of
Computer-Animated Evidence in Both Frye and Federal Rule Jurisdictions*

In both *Frye* and Federal Rule jurisdictions, computer-animated evidence, when used for substantive purposes, constitutes inadmissible hearsay.²⁸⁸ Specifically, animations constitute statements made out of court that are being offered to prove "the truth of the matter asserted."²⁸⁹ As a result, computer-animated videotapes must be excluded as hearsay evidence unless they can fit into one of the numerous exceptions to the hearsay rule.²⁹⁰

The only exception to the hearsay rule that might plausibly encompass computer-animated videotapes is the residual or catchall exception.²⁹¹ Animations fail to fall within the catchall exception for two reasons. First, because incentives exist for the creators of computer-animated evidence to prepare the videotapes in a biased manner and the production process is flawed, computer-animated evidence lacks the requisite "circumstantial guarantees of trustworthiness."²⁹² Second, admission of animated evidence does not promote the "general purposes of the [federal] rules" or the "interests of justice" because the admission into evidence of a computer-animated videotape will often unfairly prejudice a criminal defendant, mislead the jury and present cumula-

²⁸⁶ See *supra* notes 150-85 and accompanying text for a discussion of commentators' criticisms of computer-animated evidence.

²⁸⁷ See Baird, *supra* note 19; Sherman, *Moving Graphics*, *supra* note 1, at 32; Kennedy, *supra* note 41, at 1-2; Strasser, *supra* note 19, at 1.

²⁸⁸ See FED. R. EVID. 801(c). In the remainder of this Note, all discussions of hearsay refer only to jurisdictions that have adopted the Federal Rules of Evidence or an equivalent set of rules. In addition, unless otherwise stated, such discussions do not include animations being used as demonstrative evidence.

²⁸⁹ See FED. R. EVID. 801(c); Chaney, *supra* note 6, at 756.

²⁹⁰ See, e.g., FED. R. EVID. 801, 803-04.

²⁹¹ Compare FED. R. EVID. 803(24), 804(b)(5) with FED. R. EVID. 801, 803-04.

²⁹² See FED. R. EVID. 803(24), 804(b)(5).

tive evidence.²⁹³ Thus, computer-animated evidence does not fall within the purview of the catchall exception and, therefore, constitutes inadmissible hearsay.

C. *Inadmissibility of Computer-Animated Videotapes under
The Balancing Test of Federal Rule of Evidence 403*

Consideration of the likelihood that the admission into evidence of a computer-animated videotape will unfairly prejudice its opponents, mislead the jury and present cumulative evidence leads to the inevitable conclusion that courts should deem such evidence inadmissible. Rule 403 of the Federal Rules of Evidence provides that "[a]lthough 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, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence."²⁹⁴ Whichever "path to admissibility"²⁹⁵ is pursued, the policies enumerated in Rule 403 must be addressed.²⁹⁶

Computer-animated evidence may unfairly prejudice its opponents by containing "subliminal messages" and by inviting verdicts based upon emotion rather than objective fact.²⁹⁷ In addition, computer-animated evidence may mislead juries because jurors may overestimate the value of such evidence, and inaccuracies in the animation will often go undetected.²⁹⁸ Finally, because animated evidence often shows little more than the information to which an expert has already testified, it may, in some circumstances, constitute cumulative evidence.²⁹⁹

²⁹³ See *id.* See *infra* notes 294–301 and accompanying text.

²⁹⁴ FED. R. EVID. 403. Rule 403 only applies to jurisdictions that have adopted the Federal Rules of Evidence or equivalent codes. The general policies surrounding Rule 403, however, are applicable whether the Federal Rules of Evidence or the *Frye* standard is used. See 1 MCCORMICK ON EVIDENCE 779 (John William Strong ed., 1992).

²⁹⁵ See *supra* notes 187–248 and accompanying text for a discussion of (a) the common law principles of demonstrative evidence, (b) the *Frye* standard of general acceptance and (c) the admissibility standard under the Federal Rules of Evidence—the relevancy approach.

²⁹⁶ See 1 MCCORMICK, *supra* note 294, at 779.

²⁹⁷ Sherman, *Impact*, *supra* note 150, at 33; Kennedy, *supra* note 41, at 1–2; Sherman, *Moving Graphics*, *supra* note 1, at 32; See *Gibson v. Gunn*, 202 N.Y.S. 19, 20 (N.Y. App. Div. 1923) ("the moving pictures present a fertile field for exaggeration of any emotion or action . . ."), *aff'd on reh'g*, 202 N.Y.S. 927 (1924).

²⁹⁸ *Science and Technology Week*, *supra* note 41; see also Krieger, *Now Showing*, *supra* note 7, at 92; Kennedy, *supra* note 41, at 1–2; Sherman, *Moving Graphics*, *supra* note 1, at 32; Strasser, *supra* note 19, at 1.

²⁹⁹ See *Hadrian v. Milwaukee Elec. Ry. & Transp. Co.*, 1 N.W.2d 755, 758 (Wis. 1942) (admission of motion picture was error because, among other things, it proved fact previously established by undisputed testimony of witness).

In sum, computer-animated evidence may unfairly prejudice its opponents, mislead jurors and present cumulative evidence. The probative value of computer-animated evidence will often be substantially outweighed by these counterweights.³⁰⁰ In such circumstances, Federal Rule of Evidence 403 mandates that computer-animated evidence be declared inadmissible.³⁰¹

D. *Proposed Amendment to the Federal Rules of Evidence*

The current rules of evidence fail to provide judges with sufficient guidelines for the admissibility of computer-animated evidence.³⁰² Moreover, the current rules fail to provide adequate safeguards against the admission of potentially dangerous computer-animated evidence.³⁰³ If adequate constraints are imposed, computer-animated evidence will be used only in appropriate situations. The following proposed amendment to the Federal Rules of Evidence accomplishes this:³⁰⁴

Limited Admissibility of Computer-Animated Evidence

- (a) **Definition.** "Computer-animated evidence" is a series of still images created on a computer, which are subsequently recorded one at a time onto a videotape, laser disk or other similar medium to produce a moving picture.
- (b) **Establishing an adequate foundation.** In all cases, both civil and criminal, establishing an adequate foundation is a prerequisite to the admission of computer-animated evidence. To be adequate, the foundation must establish the reliability of:
- (1) the original source data, as well as all calculations used in analyzing the data,
 - (2) Its input into the computer,
 - (3) the operation of the computer and software,
 - (4) the output process used for the graphics,
 - (5) the medium used to reproduce the computer graphics for presentation at trial and,
 - (6) the accuracy of the animation itself.³⁰⁵

³⁰⁰ See *supra* notes 294-99 and accompanying text.

³⁰¹ See FED. R. EVID. 403.

³⁰² Bulkeley, *supra* note 3.

³⁰³ See *supra* notes 150-85 and accompanying text.

³⁰⁴ Although proposed as an amendment to the Federal Rules of Evidence, it is hoped that all states, including the remaining *Frye* jurisdictions, adopt a similar statute.

³⁰⁵ See Krieger, *Admitted*, *supra* note 6, at 96.

- (c) **Civil Cases.** In addition, in civil cases, computer-animated evidence is admissible except when:
- (1) the probative value of such evidence is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury or
 - (2) the proponent of such evidence fails to provide sufficient notice to the opposing counsel.
- (d) **Criminal Cases.** In addition, in criminal cases, computer-animated evidence may be used only if it meets all of the following requirements:
- (1) it is used to depict a linear movement capable of measurement by generally accepted scientific principles (i.e., mathematical formulas),
 - (2) it involves no recreation or portrayal of human movement,
 - (3) the evidence is used to prove a material fact that cannot adequately be proven in a less prejudicial manner,
 - (4) the probative value of the evidence substantially outweighs the danger of unfair prejudice, confusion of the issues and misleading the jury and,
 - (5) the proponent of such evidence provides opposing counsel with sufficient notice to allow the opposition a fair opportunity to prepare for cross-examination.
- (e) **Accordance With Other Rules.** This rule in no way restricts the application of any other Federal Rule of Evidence to computer-animated evidence.

Part (b) of the proposed rule requires the establishment of an adequate foundation as a prerequisite to the admission of computer-animated evidence. Further, the rule enunciates the specific requirements necessary to establish such a foundation. The purpose of this requirement is to ensure that only reliable and trustworthy animations are admitted into evidence. By requiring the proponent of animated evidence to establish the accuracy of the entire production process, this requirement will expose previously undetected inaccuracies. This is beneficial in two ways. First, judges will detect animations that contain inaccuracies and will refuse to admit them into evidence. Second,

this requirement will encourage care and honesty in the production of animations. Specifically, litigants' strong interest in having their animations admitted into evidence will cause them to do everything within their power to ensure their accuracy. Similarly, producers of animation, in order to maintain a good reputation, will make every effort to produce an accurate product. Thus, part (b) of the proposed rule will increase animation reliability as well as improve the rate of detection of inaccuracies. Therefore, part (b) of the proposed rule will lead to an increase in the accuracy of admissible animated evidence.

The proposed rule creates two distinct standards for admission—one for civil trials and one for criminal prosecutions. Generally, in civil trials, where only property interests are at stake, all relevant evidence is admissible. Only in extreme situations will evidence be excluded as unduly prejudicial in civil cases. In criminal prosecutions, however, where life and liberty are at stake, a more stringent admissibility standard is necessary. In such situations, any evidence that may mislead the jury or unfairly prejudice the litigant must be excluded from evidence. Thus, with two distinct admissibility standards, the proposed rule is able to provide criminal defendants with additional safeguards necessary to protect their transcendent interests in the prosecution.

Part (c) enunciates the admissibility standard for computer-animated evidence in civil trials. The rule is one of inclusion. More specifically, computer-animated evidence is admissible in civil trials unless one of the two stated conditions occurs. Thus, if the probative value of the animation is outweighed by the stated counterweights or the proponent of the animation fails to provide sufficient notice to opposing counsel, then the animation must be excluded. In all other situations, however, the animation is admissible. Significantly, this provision maximizes the amount of relevant evidence to reach the trier of fact. Simultaneously, it prevents the admission of highly prejudicial evidence. Animations are excluded when their admission would unfairly prejudice a litigant or mislead the jury. Similarly, animations must be excluded if their proponent fails to provide opposing counsel sufficient notice to allow him or her a fair opportunity to prepare for cross-examination.

Part (d) enunciates the admissibility standard for computer-animated evidence in criminal prosecutions. The rule is one of exclusion. Computer-animated evidence is admissible in criminal prosecutions only if all five of the enumerated requirements are satisfied. The purpose of this provision is to ensure adequate protection of the rights of the criminal defendant. More importantly, it is essential that all potentially prejudicial, misleading and inaccurate materials be ex-

cluded from evidence. If all five enunciated requirements are met, justice requires admitting the animation into evidence.

The first requirement for admission of animations in the criminal context provides that the animation depict only linear movements capable of measurement by generally accepted scientific principles. This requirement ensures the accuracy of all admitted animations. By restricting the admissibility of animations to those that can be measured with precision, speculation in the creation of animations is reduced. Further, the animation can be created, and evaluated, with simple mathematical formulae.

Similarly, the second requirement that animations must satisfy prohibits the animation from depicting human movement. This requirement attempts to ensure accuracy. Graphic recreation of human motion inherently involves speculation because the precise movement of the human body simply cannot be reenacted. As a result, animations depicting human motion are made per se inadmissible.

The third requirement provides that the animation may only be used to prove a material fact that cannot adequately be proven in a less prejudicial manner. Given the tendency of animations to unduly prejudice criminal defendants, mislead juries and contain inaccuracies, such evidence should only be admissible when it is absolutely necessary. If the animation attempts to prove an immaterial fact or one that could be proven in a less prejudicial fashion, the admissibility of the animation is clearly not essential to the case. Thus, such an animation must be excluded from evidence.

The fourth requirement for admission of animation in the criminal context further protects the interests of the criminal defendant. This subsection provides that, for animation to be admissible, its probative value must substantially outweigh the dangers of unfair prejudice, confusion of the issues and misleading the jury. Importantly, the rule uses the phrase "*substantially outweighs*" in describing this required weighing process. Thus, the requirement establishes a significant burden on the proponent of the animation. This provision is consistent with the general need to protect the interests of criminal defendants.

The fifth requirement of the suggested provision states that the proponent of the animation must provide opposing counsel with sufficient notice that an animation will be offered. This rule will allow the opposition a fair opportunity to prepare an effective cross-examination. Cross-examination is essential in order to enable the opposition to expose inaccuracies in the animation. By ensuring sufficient time to prepare for cross-examination, the provision increases the likelihood

that inaccuracies in the animation will be detected during trial. This, in turn, protects the interests of the criminal defendant.

In sum, the proposed rule imposes much needed safeguards upon the admission of potentially dangerous computer-animated evidence. The rule ensures that only those animations with sufficient indicia of reliability are admitted into evidence. Further, the rule excludes all potentially misleading or prejudicial animations from evidence. Finally, the rule maximizes the opportunity for opponents of animations to expose the inaccuracies in those animations being used against them. Given the inability of current standards to adequately protect litigants from potentially dangerous computer-animated evidence, all jurisdictions should adopt the proposed rule.³⁰⁶

V. CONCLUSION

In determining the admissibility of computer-animated evidence, no hard and fast rule can be used. It is important that lawyers and judges remain wary of several things. First, the admission into evidence of a computer-animated videotape may be unfairly prejudicial, may mislead the jury and may constitute cumulative evidence. Second, they must bear in mind the likelihood of inaccuracies in animations and the difficulties involved in detecting them. Third, they must remember that animated evidence may constitute inadmissible hearsay. Fourth, they must keep in mind the different standard for admissibility of such evidence in civil and criminal cases.

The current rules of evidence fail to provide judges with sufficient guidelines for the admissibility of computer-animated evidence. Moreover, the current rules fail to provide adequate safeguards against the admission of potentially dangerous computer-animated evidence. As a result, computer animations have become quite commonplace in civil trials. In addition, the case by case analysis given to animations in the criminal context has led to the admission of such evidence in several recent prosecutions.

With the addition of the proposed amendment to the Federal Rules of Evidence, both attorneys and judges will be in a position to better assess the admissibility of computer-animated evidence. The rule clearly establishes the foundational requirements necessary to ensure that only reliable and trustworthy animations be admitted. Further, it creates two distinct standards for admission—one for civil trials and one for criminal prosecutions. By doing so, it is able to provide crimi-

³⁰⁶ See Bulkeley, *supra* note 3.

nal defendants with additional protection necessary to protect their transcendent interests in the prosecution. Finally, the proposed rule makes an important distinction between animations that recreate predictable, mechanical recreations of machine generated accidents and those that attempt to replicate the movement of human beings.

Animated evidence has great potential for abuse, especially in the criminal context. Animations are simply artfully planned and staged presentations promoting one party's unproven theory. Such "evidence," with its tremendous persuasiveness and retention value, must, in most prosecutions, be excluded. Only reliable evidence should be viewed by the trier of fact—the examination of staged presentations must be left to the Oscars' Nominating Committee.

MARC A. ELLENBOGEN