THE ADMISSIBILITY OF 3-D COMPUTER ANIMATIONS UNDER THE FEDERAL RULES OF EVIDENCE AND THE CALIFORNIA EVIDENCE CODE

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I. INTRODUCTION

Trial lawyers traditionally have used visual aids such as photographs, maps, diagrams and timelines on blow-up foam boards and placards, and even chalkboards and paper flip charts, to help juries understand, retain and recall key factual and legal arguments made during trial.[1] Modern trial attorneys have not abandoned the traditional use of such visual aids, but over the last decade they have greatly augmented their mode of graphic presentation and their overall visual communication techniques at trial. Many trial lawyers have begun to use computer generated exhibits, especially high tech graphics and even 3-D computer animations, in order to enhance their communication with modern jurors and persuade them in a very powerful, dynamic and effective way.[2] These attorneys use computer generated exhibits in their opening statements and closing arguments, as

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1. *See, e.g.*, Jennifer L. Mnookin, *The Image of Truth: Photographic Evidence and the Power of Analogy*, 10 YALE J.L. & HUMAN. 1 (1998) (tracing the history of the use of demonstrative evidence in courtrooms); Jane A. Kalinski, Note, *Jurors at the Movies: Day-in-the-Life Videos as Effective Evidentiary Tool or Unfairly Prejudicial Device?* 27 SUFFOLK U. L. REV. 789, 789 n.2 (1993) (reporting that "jurors watching visual presentations retained 100 percent more information than jurors hearing oral presentations."); Jeffery R. Boyll, *Psychological, Cognitive, Personality and Interpersonal Factors in Jury Verdicts*, 15 LAW & PSYCHOL. REV. 163, 173-74 (1991) (noting that "much of what is presented [to jurors] may be misunderstood" and "[a]s much as two-thirds of what is heard may be immediately forgotten").

2. *See* Fred Galves, *Where the Not-So-Wild Things Are: Computers in the Courtroom, the Federal Rules of Evidence, and the Need for Institutional Reform and More Judicial Acceptance*, 13 HARV. J.L. & TECH. 165, 165 n.2 (2000).

well as in examining witnesses (especially expert witnesses) in order to help clarify complex, and sometimes even boring, but critically important trial information.[3]

Display technology is being used at trial so that jurors can better understand, comprehend and retain that crucial information due to an effective combination of visual and oral communication.[4] The effective use of these types of modern computer exhibits cannot be realized, however, if they are deemed inadmissible and therefore are excluded from trial so that jurors never see or experience them.

This article sets forth typical evidentiary objections that are often made challenging computer animation exhibits and addresses those objections both under the Federal Rules of Evidence and the California Evidence Code. Many objections under the Federal Rules ("Rules" or "FRE") and the California Code ("Code" or "CEC") are similar and therefore courts interpret them similarly; however, there are some key differences. This article is not an exhaustive attempt to address every conceivable objection to the admissibility of computer animations; rather, it is an attempt to consider a representative sampling of some of the more common objections made under the Rules/Code.

II. ADMISSIBILITY ISSUES/OBJECTIONS

A. Relevance

1. Rule 401 FRE

Under Federal Rule 401, to be admissible the animation would need 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."[5] Depending upon how the animation is used, this is a fairly easy

3. *See id.* at 183.

4. *See* Symposium, *Panel Three: Demonstration and Discussion of Technological Advances in the Courtroom*, 68 IND. L.J. 1081, 1082 (1993) ("Research has shown that the use of visual aids with an oral presentation can aid comprehension, minimize understanding, and increase retention level by as much as sixty-five percent."); Galves, *supra* note 2, at 189 n.77 (discussing a study showing "jurors given visual presentations retained 100% more information that those given oral presentations alone") (citing Windle Turley, *Effective Use of Demonstrative Evidence—Capturing Attention and Clarifying Issues*, TRIAL, Sept. 1989, at 62).

5. FED. R. EVID. 401.

threshold to meet. To the extent the animation is being used as a demonstrative exhibit – which is an exhibit to help clarify verbal testimony of an eye witness or an expert witness[6] – it would be relevant, as long as the underlying testimony the demonstrative exhibit is being used to clarify is relevant. Thus, the animation's relevance is derived from the relevance of the underlying testimony it is being used to help clarify as it has no independent probative value itself. It logically follows that an animation clarifying irrelevant testimonial evidence would also necessarily be irrelevant.

However, even if the underlying testimonial evidence that an animation clarifies is relevant, one might argue that the demonstrative animation itself still could be deemed irrelevant if the animation adds nothing to the testimony, and consequently would be completely superfluous. As such, it would have no probative value itself, and therefore, no relevancy apart from the underlying testimonial evidence it depicts. In such circumstances, the animation would not even qualify as a demonstrative exhibit in the first place because it would not "clarify" anything. If the underlying testimonial evidence is fully self-explanatory, such that the visual exhibit truly adds nothing to that verbal testimony, then a judge would most likely exclude the demonstrative exhibit because it would not even meet the threshold definition of a demonstrative exhibit – it would clarify nothing – not to mention the fact that under Rule 403, it is excludable as the "needless presentation of cumulative evidence."[7] On the other hand, if it meets the definition of a demonstrative exhibit because it clarifies the relevant testimony of a witness, then the exhibit also should be relevant to the same extent the underlying testimony is relevant.

Relevancy determinations become more complicated when the computer animation is used substantively as a simulation or re-creation; the exhibit is used not merely to clarify relevant testimony, but instead is evidence itself based on input data which has been fed into a computer program and a specific graphical result has been produced which the advocate wants the jury to consider substantively for its factual value. Like an in-court experiment, then, the relevancy of such a computer simulation or re-creation is relevant only if it is "substantially similar" to the events that are at issue.[8] Accordingly, for a computer re-creation of an event to be

6. *See* Galves, *supra* note 2, at 177 n.45 (discussing how "[d]emonstrative evidence is addressed directly to the senses and is concerned with real objects that illustrate some verbal testimony, but has no independent probative value in itself.") (citing BLACK'S LAW DICTIONARY 577 (7th ed. 1999)).

7. FED. R. EVID. 403.

8. *See* Brandt v. French, 638 F.2d 209, 212 (10th Cir. 1981) (applying the "substantially

relevant, that re-creation would have to have been made under similar circumstances as the actual event in question. Logically, it would not matter if a certain result is achieved in a computer simulation that was conducted under circumstances substantially different from those present in the case at issue; therefore, such a computer simulation would be irrelevant. However, as long as the circumstances are close enough to be scientifically meaningful for comparison purposes, courts would find such substantially similar re-creations or simulations relevant, and would leave any minor discrepancies up to the jury in making a credibility determination.[9]

2. CEC §210/§350

Relevancy determinations under the California Evidence Code are very similar. Under the California Code, "[e]vidence [including credibility] having any tendency in reason to prove or disprove any disputed fact that is of consequence to the determination of the action" is relevant.[10] The language of the Code is different from its Federal Rule 401 counterpart.[11] The literal terms of the Code appear to limit relevancy to "*disputed* fact,"[12] whereas the Federal Rule says "*any* fact;"[13] and the California Code says "any tendency *in reason*"[14] whereas the Federal Rule merely says, "any tendency"[15] and does not qualify it by saying, any tendency *in reason*.

Despite this difference in terminology, no differences appear in the application of the relevancy Code. It could be argued, however, that given the language in the Code, a demonstrative exhibit does not go to an ultimate fact because it is by definition derivative. In other words, under the Code, the underlying testimony may go to ultimate facts, but the demonstrative exhibit that just visually clarifies that testimony would not go to an ultimate fact (it merely would clarify testimonial evidence, but only that testimonial evidence would go to an ultimate fact). No court has so held because the

similar test" for admission of evidence of experiments); Four Corners Helicopters, Inc. v. Turbomeca, S.A., 979 F.2d 1434, 1442 (10th Cir. 1992) (stating that "[e]xperiments purporting to simulate actual events may be admissible if made under conditions which are substantially similar to those which are the subject of the litigation.").

9. *See, e.g.*, Persian Galleries, Inc. v. Transcontinental Ins. Co., 38 F.3d 253, 258 (6th Cir. 1994) (ruling that minor alleged discrepancies "reflect, not upon the admissibility of evidence, but rather upon its credibility, an assessment assigned exclusively to the discretion of the jury.").

10. CAL. EVID. CODE § 210 (West 2007).

11. *See* CAL. EVID. CODE § 210 (West 2007); FED. R. EVID. 401.

12. CAL. EVID. CODE § 210 (West 2007).

13. FED. R. EVID. 401.

14. CAL. EVID. CODE § 210 (West 2007).

15. FED. R. EVID. 401.

legislative history to the California relevancy Code includes "other facts from which such ultimate facts may be presumed or inferred" and as such, no direct/indirect distinction has been made.[16]

Despite the language differences, there is no difference in the relevancy standards for either demonstrative or substantive uses of computer animations. There are not many California cases that have addressed computer animations, either because they are simply not used all that frequently in state court as opposed to federal court, or when they are used, federal cases are cited as persuasive authority.

B. Unfair/Undue Prejudice

1. Rule 403 & §352 in General

Even if relevant, an exhibit is excludable if it contains a significant amount of "*unfair*" prejudice (under the Federal Rule), "*undue*" prejudice (under the Code) or if it "misleads" the jury (under both).[17] The policy supporting this exclusion is that courts want jury determinations based on facts and issues that truly matter in the case without the jury being unfairly (or unduly) swayed by issues or concerns not germane to the just resolution of the dispute.[18] The question then becomes: can a jury be so "*overwhelmed*" by powerful visual exhibits, such as a very life-like and persuasive computer animation, that it would be *unfair/undue* to let the jury consider the animation? In other words, do computer animations so tip the balance in favor of the side producing them, that they should be excluded? To answer yes means we would be deciding that juries are so impressed with computer animations that an opponent cannot fairly attack or respond to them because jurors simply make up their minds once they see a computer animation, instead of properly weighing it like any other piece of evidence or advocacy submitted at trial.

This is certainly a legitimate concern as there is a rich history of inflammatory photographs, for example, being excluded from trial due to unfair prejudice or concern about misleading the jury.[19] In making this

16. 7 Cal. L. Rev. Comm'n Reports 1, 46 (1965).

17. FED. R. EVID. 403; CAL. EVID. CODE § 352 (West 2007).

18. *See* FED. R. EVID. 403; CAL. EVID. CODE § 352 (West 2007).

19. *See, e.g.*, Commonwealth v. Garrison, 331 A.2d 186, 187-88 (Pa. 1975) (ruling that the admission into evidence of eleven color slides of the victim's body was reversible error); *Commonwealth v. Scaramuzzino*, 317 A.2d 225, 227 (Pa. 1974) (holding that admission into evidence of fourteen color slides showing graphic and bloody scenes was error because the probative value was outweighed by the "likelihood of inflaming the minds and passions of the

discretionary determination to exclude relevant but unfairly prejudicial exhibits, it is important to remain cognizant of the fact that the rules against unfair/undue prejudice do not mean that the judge has a legal duty to "keep the trial close."[20] As a result, simply being effective in the courtroom is not a violation of the rules and therefore abundant efficacy alone should not be considered "unfair" (or "undue").[21]

Consider the following analogies: Suppose a litigant has an articulate and very competent attorney that delivers very powerful and effective opening statements and closing arguments, and examines witnesses extremely well, while that litigant's opponent has a very mediocre attorney who tends to be boring and confusing at every stage of trial. Should this imbalance in the trial advocacy abilities of the two respective attorneys mean that the use of the more effective attorney is somehow "unfair," or "undue," and as a result, the better attorney should not be allowed to participate in the trial in order to even out the trial and thus make the contest "fair"? Clearly this is not what the rules would require. What if a party's witnesses are simply much more convincing than their opponent's witnesses? Fairness does not require exclusion of the testimony of the better witnesses. Thus, it is very important that the rules are applied in such a way that computer animations are not excluded merely because they are extremely effective, persuasive and helpful at trial. This type of result was not what the rules contemplated in excluding evidence that contains so much *unfair/undue* prejudice that it substantially outweighs its probative value.[22]

2. Rule 403 FRE

Rule 403 states, "[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."[23] Notice that the probative value must be

jurors. . ."). *But see* United States v. McRae, 593 F.2d 700, 707 (5th Cir. 1979) (overruling a 403 objection to photographs of deceased and death scene).

20. *See* McRae, 593 F.2d at 707 (stating that the judge's decision to exclude relevant but unfairly prejudicial evidence is a discretionary call to be made cautiously and sparingly and that Rule 403 "is not designed to permit the court to 'even out' the weight of the evidence, to mitigate a crime, or to make a contest where there is little or none.").

21. FED. R. EVID. 403; CAL. EVID. CODE § 352 (West 2007).

22. *See* FED. R. EVID. 403; CAL. EVID. CODE § 352 (WEST 2007).

23. FED. R. EVID. 403.

substantially outweighed by the danger of unfair prejudice, meaning that even if there is a strong danger of unfair prejudice, a danger that might even outweigh the probative value of the animation, that animation would still be admissible because its probative value is merely outweighed, but not *substantially* so, by the danger of unfair prejudice.[24] Thus, the probative value must be *substantially* outweighed, meaning that even if there is more unfair prejudice than probative value in the animation, it is still admissible.[25]

Recall also that "prejudice" alone, is perfectly acceptable and admissible. In fact, prejudice is exactly what makes an exhibit or testimony relevant.[26] The essence of the adversarial system is to try to convince the jury of various things before they render the final verdict. Therefore, the prejudice must be "unfair" prejudice to be excluded; it is the *unfairness* of the prejudice that makes it excludable. However, once again, unfair prejudice does not simply mean overall effectiveness and persuasiveness. The assumption is that most evidence is admissible under the Rule[27] and therefore Rule 403 should not be used to exclude evidence simply because a judge is a "technophobe" who is simply suspicious or overly fearful of computers.

Finally, under Rule 403, the "probative value" of a computer animation may be considered to be less for demonstrative computer animations than for substantive computer re-creations or simulations because substantive evidence, by definition, has independent probative value in and of itself;[28] whereas demonstrative exhibits derive their relevance from the testimonial evidence that they clarify. Therefore, because demonstrative evidence by definition tends to carry less independent evidentiary value, a plausible argument is that it is easier to substantially outweigh the probative value of demonstrative exhibits than substantive ones.

3. CEC §352

The Evidence Code provides in pertinent part that "[t]he court in its

24. *Id.*

25. *See id.*

26. *See* FED. R. EVID. 401.

27. *See* United States v. Dennis, 625 F.2d 782, 797 (8th Cir. 1980) ("In weighing the probative value of evidence against the dangers and considerations enumerated in Rule 403, the general rule is that the balance should be struck *in favor of admission*." (emphasis added)); United States v. Meester, 762 F.2d 867, 875 (11th Cir. 1985) ("Courts have characterized Rule 403 as an extraordinary remedy to be used *sparingly* because it permits the trial court to exclude otherwise relevant evidence." (emphasis added)).

28. *See* BLACK'S LAW DICTIONARY 599-600 (8th ed. 1999); FED. R. EVID. 403.

discretion may exclude evidence if its probative value is substantially outweighed by the probability that its admission will (a) necessitate undue consumption of time or (b) create substantial danger of undue prejudice of confusing the issues, or of misleading the jury."[29] Given the different language and placement of literal terms, there is an argument that the standard might be interpreted a little differently under the Code as opposed to the Federal Rule.[30] The Federal Rule says the "danger" (of the probative value being substantially outweighed by unfair prejudice) allows exclusion,[31] whereas the Code states the court may exclude if the probative value is *substantially* outweighed (just like the Federal Rule) by the probability that its admission will "create a substantial danger of undue prejudice."[32] The term "substantial" is used twice in the Code – so the probative value has to be (1) substantially outweighed . . . by (2) the substantial danger of undue prejudice.[33] This compounding of the term "substantial" may constitute a higher threshold in the Code than in the Federal Rule. The term substantial appears twice, so it may be compounded by design, meaning the prejudice has to be quite high/substantial (even more so than the Federal Rule) before the Code allows the exclusion of evidence.

However, there is another difference in language between the Code and the Federal Rule which might offset any compounding given the term "undue" prejudice, which appears in the Code,[34] as opposed to "unfair" prejudice, which appears in the Federal Rule.[35] The term "undue" might be interpreted as a lower standard in the Code because "unfair" prejudice might be deemed more acute prejudice than simply "undue" prejudice, and thus be easier to show than unfair prejudice. However, even if this were the case, the differences in the overall language of the Code and the Federal Rule might simply cancel each other out. Although the Code appears to compound the "substantiality" requirement (making it higher, because it appears twice in the Code and only once in the Federal Rule)[36] it may be cancelled out by the less acute term in the Code, "undue" prejudice,[37] as opposed to the more acute term under the Federal rule, "unfair" prejudice.[38]

29. CAL. EVID. CODE § 352 (West 2007).
30. *See* FED. R. EVID. 403.
31. *Id.*
32. CAL. EVID. CODE § 352 (West 2007).
33. *Id.*
34. *Id.*
35. FED. R. EVID. 403.
36. CAL. EVID. CODE § 352 (West 2007); FED. R. EVID. 403.
37. CAL. EVID. CODE § 352 (West 2007).
38. FED. R. EVID. 403.

Although there is possible ground for a different standard between the Code and the Rule given these differences in terminology, no court has so held and these provisions appear to be interpreted similarly, especially in light of the fact that these are highly discretionary exclusionary rules.[39] The real danger with respect to computer animations is if these exclusionary rules are used simply because judges are unfamiliar with computer animations or mistakenly assume exclusion is required merely because animations are very powerful and effective advocacy techniques.

C. Authentication/Identity

Another objection involves determining what kind of "foundation" is necessary to lay for the admission of a computer animation. In order for any tangible item or written document to be admitted, there has to have been some preliminary evidence supporting the notion that the offered exhibit is what it purports to be.[40] For example, if the jury makes a finding that a letter contains important relevant information in the case at issue such that the jury may rely upon the letter in rendering its verdict, then there must have been some evidence presented at trial (some "foundation") that the letter is indeed what it purports to be. There had to have been testimony from a witness who either wrote the letter, read it, recognized it, or who was able to provide any other evidentiary foundation that the jury could base a finding that the letter is authentic. This is true for the admissibility of all documents, photographs, and essentially all forms of non-testimonial exhibits and physical evidence.

With respect to computer animations, a common foundational concern is whether the computer programmers of the animation must testify in order to authenticate it or what else, if anything, must be demonstrated to lay a sufficient foundation for it. Much of this determination depends upon *how* the animation is to be used at trial. There is a fairly simple foundation requirement if the animation is used as a *demonstrative* exhibit – merely clarifying the testimony of a witness – but a much more involved foundation if the animation is used as a *substantive* exhibit – that is, as independent evidence itself.

If the animation is used demonstratively, then the foundation is simple

39. *See* Adkins v. Brett, 193 P. 251, 258 (Cal. 1920) (stating that "the matter of excluding prejudicial evidence is largely one of discretion on the part of the trial judge.").

40. *See* 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.").

because the reliability of the animation, and what it depicts, exists in the cross-examination of the witness whose testimony the animation is being offered to clarify. It is similar to laying the foundation for a photograph of a crime scene when there is an eyewitness who was at the crime scene at the time of the alleged crime. Thus, in order to help clarify the witness's testimony about the events at the crime scene on the day in question, a prosecutor may submit a crime scene photograph as a demonstrative exhibit. Admissibility would require the attorney to ask the witness whether the photograph is a "fair and accurate" depiction of the crime scene on the day in question and if it would help the witness to explain his testimony.[41] If so, a judge would admit it as a demonstrative exhibit.[42]

Any concern with the foundational reliability of the photograph at that point can be tested through vigorous cross examination of the eye witness concerning what exactly the photograph depicts. Accordingly, it is not necessary for the computer programmers of a computer animation to testify, just as it would not be necessary for the photographer of a crime scene photograph to testify regarding the taking or developing of the photograph. So regardless of how complex the creation and development of a computer animation may be, as long as it merely depicts the oral testimony of the witness on the stand ready to be cross examined about it, there is no need for any further elaboration of the foundation and it is error to suggest otherwise. As an example, it would be similar to requiring a computer programmer from Microsoft to testify as to how its Word software program operates because a secretary generated a letter (using the software program) that an attorney wants to admit in evidence. A Microsoft Word programmer would not be necessary to lay the foundation for that letter. Instead, the foundation would be laid by questioning someone who either drafted the text of the letter, received the letter, or who recognized the signatures, letterhead or some such other basis that allows a witness with personal knowledge to identify the letter and provide testimony satisfying the necessary foundation to authenticate the letter.[43]

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41. *See* 2 GEORGE E. DIX ET AL., MCCORMICK ON EVIDENCE 14-15 (6th ed. 2006).

42. *See id.*

> As illustrative evidence, a photograph is viewed merely as a graphic portrayal of oral testimony. It is authenticated if the witness testifies that the photograph is a correct and accurate representation of relevant facts personally observed by the witness. Accordingly, under this theory, the witness who lays the authentication foundation need not be the photographer, nor need the witness know anything of the time, conditions or mechanisms of the taking of the picture. . . . Once personal knowledge is shown, the witness can say whether the photograph correctly and accurately portrays what the witness saw. The photograph thus verified is admissible as a graphic portrayal of the verifying witness's testimony.

Id.

43. *See, e.g.*, FED. R. EVID. 901(b)(2), (b)(4); CAL. EVID. CODE §§ 1416, 1421 (West 2007).

On the other hand, if the computer animation is used *substantively*, that is, not merely to depict oral testimony of an eyewitness, or oral testimony of an expert witness that merely graphically represents their opinion testimony,[44] then a more elaborate foundation is required.[45] To return to the example of the crime scene photograph, let us assume this time that instead of a photograph that graphically depicts a scene where an eyewitness allegedly viewed events in the case at issue, the prosecution wants to submit a surveillance camera photograph taken at a certain date and time of what appears to be the defendant robbing the victim in a robbery prosecution case. Note the use of the photograph this time: there is no eye witness to testify whether the photograph is a fair and accurate portrayal of what the witness allegedly saw. Instead, the photograph is evidence itself, or circumstantial evidence, proving that the robbery the defendant is accused of actually occurred.

Note that the reliability of the surveillance photograph would not be in the cross-examination of any eyewitness who saw anything, but instead would be reliant on the photograph itself, how and when it was taken and under what circumstances the automatic camera was operating at the time in question. This necessarily requires more foundation because there is no eyewitness to the depicted event in the photograph.[46] Applying these concepts to a computer animation that takes input data and produces a result as circumstantial evidence as to what "must have happened" given that input data, there would need to be a much more involved foundation regarding the preparation and creation of the animation. The proponent of the substantive animation should demonstrate the following foundational requirements about the animation and the circumstances under which it was created:

(1) The input data is accurate, based on reliable measurements;

(2) The data taken was consistent with laws of nature;

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44. *See* DIX ET AL., *supra note* 41, at 38-39.

45. *See id.* at 39-40.

> Computer-generated simulations that re-create and graphically depict disputed events are generally considered to be sources of substantive evidence for the trier. Even when simulations are introduced through the testimony of an expert opinion witness, the graphic simulation itself is independently relevant to prove a fact consequence – how an occurrence would have happened. The computer-generated 'opinion' is determined by the scientific principles that an expert has programmed into the computer. Thus, the simulation must be authenticated as an accurate result of a system or process, pursuant to Federal Rule of Evidence 901(b), by a set of factors . . . .

Id.

46. *See* John E. Mouser and James T. Philbin, Comment, *Photographic Evidence –Is There a Recognized Basis for Admissibility?* 8 HAST. L.J. 310 (1956) (noting that scenes photographed by infrared flash or by electronically triggered surveillance cameras are not seen by any potential witness).

(3) Commercially recognized and tested hardware and software was used;

(4) The system has the capacity to execute applications intended to perform subject to appropriate input/output controls;

(5) There was no relevant data omitted or overemphasized;

(6) There were properly trained & supervised technicians overseeing the animation.[47]

1. Rule 901 FRE

There may be an easier way to satisfy the substantive use foundation for a computer simulation or re-creation under the Federal Rules. Federal Rule 901(b)(9) states, "[e]vidence describing a process or system used to produce a result and showing that the process or system produces an accurate result" satisfies the foundation requirement.[48] The advisory committee notes specifically include the application of computers in this example.[49] Like a radar gun or a calculator that uses a process to produce a result given various input data, perhaps a computer animation that produces a result based on reliable input data could set forth the necessary foundation. A problem, of course, is that typically a computer animation is prepared in anticipation of specific litigation, as opposed to the results obtained by use of a radar gun or calculator which are not nearly as "litigation focused" in their use, even though the results might eventually be used in litigation, and there tend not to be so many technological variables in these more simple forms of technology.

2. CEC §1400

The California Code has no similar provision as the Federal Rule regarding computer animations as a "process or system." The California Code is similar, however, with respect to the process of admitting computer animations that are used demonstratively.[50] For example, in *People v. Rodrigues*, a videotaped reenactment of a crime was admitted because the "reasonable representation of that which it is alleged to portray . . . would

47. *See* Galves, *supra* note 2, at 231.

48. FED. R. EVID. 901(b)(9).

49. FED. R. EVID. 901(b)(9), *reprinted in* FEDERAL RULES OF EVIDENCE FOR UNITED STATES COURTS: LEGISLATIVE AND DRAFTING HISTORY, ARTICLE IX. AUTHENTICATION AND IDENTIFICATION app.1 (3rd ed., West 2007).

50. *See, e.g.*, People v. Rodrigues, 885 P.2d 1, 26 (Cal. 1994).

assist the jurors in their determination of the facts."[51] There was no mention that demonstrating how a videotape works, or who operated the camera, was necessary foundation for the videotape's admissibility. Instead, the reliability of the demonstrative exhibit was really in the opportunity to cross-examine the eye witness to the event depicted therein.[52]

The same is true for experts who use computer animations at trial. If the animation is used demonstratively solely to help to explain the expert's pre-existing theory or opinion, then it would be admissible with a very simple foundation of the witness explaining that the animation clarifies the witness's testimony and nothing more. However, such would not be the case if experts were to use the computer animation substantively to assist them in arriving at their expert opinions. The animation would do more than merely clarifying the expert's opinion at that point; it would go beyond that as substantive evidence itself, because the jury would rely not only on the expert's opinion testimony, but also on the animation itself as evidence.

D. Experts/Scientific Evidence

An important objection that is dealt with differently under the Federal Rules and the California Code is the use of computer animations with respect to expert witnesses and scientific evidence. Different standards apply to scientific evidence. In federal courts, *Daubert v. Merrell Dow Pharmaceuticals*[53] applies, while a different standard was adopted in California under *People v. Kelly,*[54] applying the *Frye* test, set forth in *Frye v. United States*,[55] which the federal model rejected under *Daubert.* The California standard is the *Kelly-Frye* test.[56]

Before getting to that distinction, however, it is important not to confuse the *underlying science in the case* (say the physics, accident reconstruction, engineering, or medical science – which are all *Daubert, Kelly-Frye* concerns), with the *science involved in the mere creation of computer animations* – which often has nothing to do with the underlying science that is at issue in the case. If an animation is used demonstratively, then the underlying technology or science used to create that animation is irrelevant to the case. Consider an analogy: Suppose an expert witness

51. *Id.* at 26.

52. *Id.* at 27.

53. *See* Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579, 597 (1993).

54. *See* People v. Kelly, 549 P.2d 1240, 1244 (Cal. 1976).

55. *See* Frye v. United States, 293 F. 1013, 1014 (D.C. Cir. 1923) (setting forth the "*Frye* test" for scientific evidence).

56. *See Kelly*, 549 P.2d at 1244.

medical doctor is testifying about her expert opinion regarding a plaintiff's alleged neck injuries and is using a wax human skeleton model as a demonstrative exhibit to help clarify her testimony about how neck vertebrae can be injured in an automobile accident. It would be illogical to exclude that expert's medical opinion testimony simply because the expert physician witness did not know *how such wax models are manufactured.* The wax model is not evidence itself, and the expert is using it only to clarify her testimony. The technology used to make the wax model would not be the underlying science involved in the case. Similarly, the technology used to create a computer animation is not the underlying science at issue in the case either. Thus, it should not matter how the wax skeleton used by the expert was made, no matter how life-like and helpful it may be in understanding the wax skeleton model.

Similarly then, a computer animation that merely clarifies an expert's opinion testimony is a demonstrative exhibit and therefore the expert should not be charged with knowing all the intricacies of how the animation was created and how exactly it generated the images that help the expert explain her testimony. Although this seems obvious, in *Commonwealth, Department of Environmental Services v. Al Hamilton Contracting Co.,* a computer-generated contour map was excluded because the hydro-geologist expert was unfamiliar with how the computer generated it.[57] This would have been a valid result only if the animation was used substantively – as evidence itself – but not if the animation was made solely to help explain the expert's pre-existing opinion testimony. Just as an eyewitness need not know how a camera technically works to capture an image of a crime scene but can still testify using a photograph as a demonstrative exhibit to help clarify eyewitness testimony, so should an expert be able to use a computer animation to help explain the expert's opinion testimony without the expert being required to know all of the intricacies of how an animation technically is created to produce certain images which help explain scientific principles.

The real issue then, is whether the animation is a demonstrative exhibit or whether it is a substantive re-creation or simulation. If it is substantive, then the science used in the computer re-creation/simulation is critical because that is what is being relied upon as evidence itself. At that point one would need to cross examine the expert on the underlying science of the computer simulation/re-creation generating a result based on input data. *Daubert* and *Kelly-Frye* become critical at this point—should the judge, as

57. Commonwealth, Dep't of Envtl. Servs. v. Al Hamilton Contracting Co., 665 A.2d 849, 852-53 (Pa. Commw. Ct. 1995).

the "gatekeeper," allow in this alleged scientific evidence under *Daubert*, and does it need to be generally accepted evidence under *Kelly-Frye*?[58]

It is important that attorneys try not to categorize substantive computer re-creations/simulations, with a stringent foundation to meet and where the computer technology used to create the exhibit matters, as mere demonstrative animations, with a much easier foundation to meet and where the computer technology used to create the exhibit does not matter. It is possible that attorneys may attempt to "sneak in" substantive computer evidence as mere demonstrative computer exhibits. If this is attempted, judges simply need to remain cognizant of their duties not to allow such manipulation/miscategorization to take place. That such improper manipulation may be attempted does not mean that computer animations should therefore be excluded wholesale, or all have to qualify as substantive exhibits, even if truly demonstrative. Instead, judges should be vigilant in assessing exactly the purpose of the animation – substantive or demonstrative – and then decide accordingly. Otherwise, such a "throw-the-baby-out-with-the-bath-water" approach would be both unfair and unwise.

1. CEC §801/804/*Kelly-Frye*

In *Frye*,[59] any party trying to admit scientific evidence had to demonstrate that the science had "gained general acceptance in the particular field in which it belongs."[60] *Frye*'s "generally accepted" requirement was criticized, however, because although it was designed to keep out non-established or "junk" science, it also would keep out new, innovative scientific techniques until they became established (or "generally accepted") which could take many years, necessarily placing courts one step behind society and denying them the use of helpful, cutting-edge scientific evidence. The California courts adopted *Frye's* general acceptance standard.

Thus, the concern may be that the science or technology in a computer animation may not meet the *Kelly-Frye* test as generally accepted science. However, ten years ago, in *People v. Hood*, the court did not exclude an animation on this basis.[61] *Hood* involved a murder case where an animation was properly admitted based on information from expert/fact witnesses.[62]

58. *See Daubert*, 509 U.S. at 597; *Kelly*, 549 P.2d at 1244.
59. *See Frye*, 293 F. at 1014.
60. *See id.*
61. People v. Hood, 62 Cal. Rptr. 2d 137, 139-40 (Ct. App. 1997).
62. *Id.*

The defendant argued that the prosecution's animation was not sufficiently acceptable technology under *Kelly*.[63] However, the 4th District held that *Kelly* did not apply because the animations were effectively the same as hand drawn illustrations by an expert.[64]

Of course, it may be different where an animation is used substantively. It is difficult to say whether computer programs that generate images based on input data are standard, or generally accepted, enough to meet the *Kelly-Frye* test. However, it is clear that this is a harder standard to meet than the federal *Daubert* test under the federal model.[65]

2. Rule 703 FRE/*Daubert*

In *Daubert,* the United States Supreme Court established a new multi-part test, in which the *Frye*-test was but one factor instead of being the entire test.[66] Under *Daubert*, the trial judge must consider the following factors in determining admissibility of the science involved: (1) whether the evidence can be (and has been) tested, (2) whether the theory or technique has been subjected to peer review and publication, (3) whether the technique has a known or potential rate of error, and (4) whether there has been a particular degree of acceptance within the relevant scientific community (essentially the *Frye* test).[67] The *Frye* test was reduced to one of the factors in the *Daubert* test, therefore, *Daubert* is a more flexible standard than *Frye* because the standard of "particular degree of acceptance" in *Daubert* is lower than the "general acceptance" test in *Frye*.[68] This disparity means that it is more likely that a federal court would admit a substantive re-creation or simulation than a California court would under the Code given the application of California's *Kelly-Frye* test.

E. Hearsay: Rules 801 FRE & CEC § 1200

As stated earlier, this article is not intended to be exhaustive of all possible objections and so hearsay is not addressed in any detail. However, it is worth mentioning that a computer animation does not fit within the definition of hearsay if used solely as a demonstrative exhibit. This is true

63. *Id.*; *Kelly*, 549 P.2d at 1240.
64. *Hood*, 62 Cal. Rptr. 2d at 140.
65. *See* Daubert, 509 U.S. at 589.
66. *See id.* at 593-94.
67. *See id.* at 593-94.
68. *Id.* at 593-94; *Frye*, 293 F. at 1014.

because if used solely as a demonstrative exhibit, the animation would not be a hearsay statement because it would not be an assertion by a declarant. Rather, it would be merely an exhibit that would be used to clarify testimony of an eye witness or of an expert.

So an animation that would merely clarify an eye witness's testimony of events witnessed is not a hearsay statement/assertion. An eye witness to a crime scene may make assertions about the crime scene if in court on the stand, but the photo that is merely a demonstrative exhibit to help clarify that testimony is not itself an out-of-court statement/assertion; therefore, it would not be necessary to get the photographer on the stand to testify directly about taking the photograph. In the same vein, it would not be necessary to get the computer animation programmers on the stand to testify directly about the creation of the animation because whatever the final product may be, its direct reliability lies within the ability to cross-examine the witness.

It is only when the animation is itself used as substantive evidence that one can argue it constitutes the out-of-court hearsay assertions of its programmers. However, one might respond that such an animation should still be admissible because it would be a non-assertion the same way a calculator that yields a result/computation, or a clock tells time, or that a radar gun can yield a statement about automobile speed and such is not excluded as hearsay. Of course, calculators are not prepared in anticipation of litigation the way animations often are so the reliability may be lost, but the hearsay exception should never apply when the animation is being used demonstratively, unless the underlying testimony it clarifies contains hearsay.

III. CONCLUSION

The more courts, juries and lawyers become familiar and comfortable with computers in the courtroom and see the benefits in clarity and persuasiveness of computer animations, the more advocates will be able to meet and overcome many objections to their use at trial.