



## Clemente v. Blumenberg

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The plaintiffs verbally moved in limine to preclude the testimony of a biomedical engineer who was being proposed as an expert witness by the defendant. Upon listening to the defense attorney's proffer of the engineer's expected testimony and after reviewing the engineer's written report, this court was skeptical about the reliability of such evidence and thereby decided to conduct a Frye<sup>1</sup> hearing to ascertain whether the evidence being proffered was "generally accepted" in the engineering community.

The plaintiff, Deborah Clemente, was a 40 year old driver of a 1996 GMC Jimmy 4-door sport utility vehicle (SUV) that was hit in the rear by a 1989 Chevrolet Astro passenger van (van) driven by Ernest J. Blumenberg, who was 17 years old at the time of the accident. At the liability portion of the bifurcated trial, the jury returned a verdict which found the defendant 73% responsible for the accident and the plaintiff 27% responsible for the accident.

During the damage portion of the trial, the plaintiff presented her treating neurologist who testified that she had sustained a herniated disk in her lower lumbar spine at the L4-5 disk and a bulge at the L5-S1 disk. These findings were objectively disclosed in a magnetic resonance imaging (MRI) scan which was admitted into evidence. The plaintiff testified that she had pain in her lower back which radiated down her right hip and into her right leg and foot. Her neurologist testified that such pain was consistent with a herniated disk at L4-5 and a bulging disk at L5-S1.

The defense presented a board certified orthopedic surgeon and a board certified radiologist as expert witnesses. Neither doctor examined the plaintiff, nor did they ever previously see her MRI films. Nonetheless, the orthopedist opined that the plaintiff's injuries were not severe enough to cause her the pain of which she complained. Moreover, he claimed that the accident could not have caused her injuries. The radiologist, after looking at the MRI films in court, testified that the plaintiff suffered from degenerative disk disease due to aging.

The defendant then proffered an engineer, M. Kenneth Salzer, who has a Master of Science degree in Biomedical Engineering from Rensselaer Polytechnic Institute in 1994 and a Bachelor of Science degree in Mechanical Engineering from Clarkson University in 1991. The engineer stated that he had studied physiology as part of the curriculum for his graduate and undergraduate degrees, but that he has not studied orthopedics or neurology and has not attended medical school or chiropractic school. Mr. Salzer is not a licensed professional engineer (P.E.), but claimed that he is eligible to sit for the P.E. licensing exam in mechanical engineering. He further claims there is no P.E. license in either biomedical or biomechanical engineering.



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Mr. Salzer has a certification as a diplomate in biomechanics through the American Board of Forensic Examiners. He is currently the Director of Biomechanical Engineering of the Eastern Division of CMR Forensic Consultants which overwhelmingly prepares reports for defendants in the insurance industry. In the past he claimed that he has given expert testimony in arbitrations, depositions and trials and has testified in 21 states, including New York, and that his testimony has been almost 100% for defendants.

Mr. Salzer testified that biomedical engineering and biomechanical engineering are essentially the same and that these disciplines apply the principles of mechanics to the specific facts of an accident and provide information about the forces generated in the accident. Biomedical engineers also examine how the body moves in response to the forces exerted in an impact. Lastly, Mr. Salzer claimed that biomedical engineers offer opinions on the types of injuries that can result from the forces of an impact.

Mr. Salzer has never met Mrs. Clemente, nor did he physically examine her. Nonetheless, based on his education, Mr. Salzer was qualified as an expert in the field of biomechanical engineering. However, the admissibility of his opinion needed further scrutiny.

The Methodology-Mr. Salzer was advised that the plaintiff, Mrs. Clemente, was wearing a seatbelt when she drove a 1996 GMC Jimmy SUV, the "target vehicle," that was struck in the rear by the defendant's 1989 Chevrolet van, the "bullet vehicle." It is the change in velocity of the target vehicle at impact that is used to calculate the forces exerted upon the occupants of the van.

The method the engineer used to compute the change in velocity of the vehicles at impact was to review color photographs of the damaged portion of the two vehicles along with the repair bills for the vehicles and to compare the cost of repair of the plaintiff's 1996 GMC Jimmy SUV with a chart entitled "Bumper Performance Repair Costs, 5 mph Crash Tests." In the chart the engineer found a GMC Jimmy SUV listed amongst 13 other SUV models from 1995 to 1997 vintage and then found a column listed "Rear into flat barrier" and found the number "\$882" which represented the average cost of repair. Since the plaintiff's repair bill for her 1996 GMC Jimmy was \$860.40, the engineer reasoned that it was close enough to the \$882 average cost of repair for a 1995 to 1997 GMC Jimmy SUV when its rear is driven into a flat barrier at 5 mph. The engineer concluded that since the repair bill was almost identical to the chart (within 2.5%), therefore the change in velocity from the plaintiff's SUV, after being struck in the rear by the defendant's van, was 5 mph. By adopting the 5 mph change in velocity the engineer justified using the data and studies he presented, which generally conclude that rear end impacts at 10 km or 6 mph or less do not yield long term serious injuries to the occupants of the target vehicle.

However, the engineer disregarded the actual facts of this case in forming his conclusion that the change in velocity was 5 mph. The testimony of the plaintiff was that she was slowing down when she was hit and that caused her vehicle to move a few feet forward. The defendant stated that the



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plaintiffs vehicle was at a stop when he hit her and that he was traveling at about 25 miles an hour when his vehicle hit the plaintiffs SUV. The defendant further stated that both vehicles did not move and remained in the same place after the impact.

In view of either version of the facts the defendant's statement that the vehicles did not move after the impact is contrary to the Newtonian theory of physics testified to by the defendant's expert engineer. Accordingly, the court finds the defendant's testimony that the plaintiff's vehicle did not move after impact to be incredible. Indeed, all the factual testimony was at odds with the methodology and assumption used by the biomedical engineer to reach his conclusion. The engineer acknowledged that if the speed of the defendant's bullet vehicle were traveling at 25 mph or 15 mph when it struck the plaintiffs target vehicle traveling at 5 mph or less then the change in velocity would be approximately double his basic assumption that the change in velocity was 5 mph. Therefore, the studies and the literature upon which he relied to form his conclusion that the plaintiff would not have suffered a herniated disk from the impact may not be applicable.

The Literature-The studies <sup>2</sup> which the engineer used to form his opinion were first supplied to the court and the plaintiffs as the Frye hearing was about to commence. At that time the court stated that the studies may be reliable. However, on reflection and with more time to examine these studies, this court is of the opinion that the literature upon which the expert relies was not independent or reliable. A review of the studies reveals that five to ten human volunteers participated in the studies who are either associated with the authors or their sponsors. By knowing the hypothesis and purpose of the testing, the responses of the participants may have biased the results. Moreover, the size of the sample is too small to create a statistically significant inference to make a general conclusion about the entire automobile riding population which is involved in rear-end collisions.

Lastly, the attempts by the various authors to boot-strap the data from other studies supporting their hypothesis which utilized similar, but different, control variables and different methodology is a stretch in an attempt to overcome the obviously inadequate number of participants in any one study. Moreover, some of the studies utilized "crash dummies" with sensors upon them to measure the force upon a potential occupant. While "crash dummies" of various sizes are widely used by automobile designers, they do not indicate that a potential occupant can-not sustain serious cervical or lumbar injuries.

Scientific or Technical Evidence Hearings-Frye hearings are rarely conducted in New York State courts unless the evidence being presented is novel. Judges usually permit professionals to testify as experts and allow the adversary process of cross-examination and opposing experts with different opinions to balance the playing field so that jurors can weigh all the opinions and render a finding based upon what they believe is true. However, when the proffered evidence purports to be scientific or technical the court with or without an objection from the opponent must review the evidence, especially when it is new or uncommon, to ascertain whether it is scientifically or technically reliable and "generally acceptable" in the scientific community to which it belongs.



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In 1923 in *Frye v. U.S.*, 293 F. 1013, 1014 (hereinafter "*Frye* ") the U.S. Circuit Court for the District of Columbia stated that:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a wellrecognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

The *Frye* decision distinguished the difference between the expert's education from his or her expertise of a specific subject matter. The body of knowledge upon which experts rely for their opinions must be separately evaluated from their professional education and training. If the underlying body of knowledge is not generally accepted by the professional community of that particular field, the testimony regardless of the brilliance of the expert is inadmissible.<sup>3</sup> The *Frye* "general acceptance" test was the most common standard across the nation in both federal and state courts until 1993. *Daubert*, *Joiner* and *Kumho Tire-In* 1993 the Supreme Court decided *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 [1993] (hereinafter "*Daubert* "). In *Daubert*, Justice Harry Blackmun, writing for the majority of the court, asserted that the Federal Rules of Evidence (FRE) enacted in 1975 supercede the common law of evidence which, by implication, included the 1923 *Frye* decision. The FRE provided the standard for admitting expert scientific testimony in federal trials (*Daubert* at 588, 113 S.Ct. 2786, 125 L.Ed.2d 469). The Supreme Court noted that while the common law may serve as an aid in interpreting the FRE, nothing in the drafting history of Rule 702,<sup>4</sup> which governs expert testimony, gives any indication that "general acceptance" is the only prerequisite for the admission of scientific evidence. Rule 703 further outlines the basis of the opinion testimony by experts and Rule 705 authorizes the expert to disclose the facts or data underlying the expert opinion.

However, Rule 702 does place limits on the admissibility of purported scientific technical or other specialized knowledge as evidence. It requires that the trial judge first ensure that the expert's testimony rests on both a reliable foundation and that it is relevant to the particular case before the court. Moreover, the expert's testimony must be based on scientific, technical or other specialized knowledge which implies that scientific methods and procedures were employed. " '[K]nowledge' connotes more than subjective belief or unsupported speculation. The term `applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds'." <sup>5</sup>

While the relevancy test of Rule 402 states that "all relevant evidence is admissible ... [and] [e]vidence which is not relevant is not admissible," the relevancy test of Rule 702 further requires that expert testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." Therefore, if the testimony is not scientifically reliable, then it is inadmissible.



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In *Daubert*, the U.S. Supreme Court asserted that judges, when faced with an offer of expert testimony, must make a preliminary assessment of whether the expert testimony reflects scientific knowledge and that there is a connection or "fit" between the testimony and the issues of the case.<sup>6</sup> The testimony's underlying reasoning or methodology must be scientifically valid and thereby reliable as evidence to be applied to the facts at issue. Some of the factors the Supreme Court suggested be considered are: (1) whether the theory or technique in question can be tested (and has been tested); (2) whether it has been subjected to peer review and publication; (3) whether its potential rate of error is known and is it statistically significant and acceptable; and (4) that general acceptance can yet have a bearing on the inquiry.<sup>7</sup> The fourth factor of general or widespread acceptance within the relevant scientific community reaffirms the *Frye* test of admitting known techniques into evidence. However, the Supreme Court also invites trial judges to view such known techniques (and theories) with skepticism if they are only minimally supported by the relevant scientific community.<sup>8</sup>

The High Court stated that the inquiry is a flexible one, and its focus must be solely based on principles and methodology, not on the conclusions that they generate.<sup>9</sup> The judge should also consider the presentation of contrary evidence and should instruct the jury on who has the burden of proof. *Daubert* highlights a trial judge's inherent role in a "gatekeeping function" to determine whether evidence is scientifically valid and whether the reasoning or methodology can be applied to the facts of the case.<sup>10</sup> The U.S. Supreme Court remanded *Daubert* to the Ninth U.S. Circuit Court of Appeals, where Judge Kozinski added a fifth factor to consider: was the expert's opinion the product of independent research or was it developed solely for the purposes of testifying?<sup>11</sup>

Chief Justice William Rehnquist expressed some concern in his concurring and dissenting opinion in *Daubert* that trial judges might become amateur scientists. However, he did acknowledge that Rule 702 imposes some gatekeeping responsibility in deciding questions of admissibility of proffered expert testimony. Indeed, in *General Electric Co. v. Joiner*, 522 U.S. 136, 118 S.Ct. 512, 139 L.Ed.2d 508 [1997] Chief Justice Rehnquist, then writing for the majority, not only reaffirmed the *Daubert* standard, but reinforced the role of the trial court as the gatekeeper of scientific evidence. In *Joiner*, the Supreme Court asserted that while different judges at the appellate level may disagree with the validity of the evidence proffered, it was not the role of the appellate courts to second guess the trial judge. The standard on appeal is whether trial judges abused their discretion. Thus, it is the trial judge who must initially rule on whether to admit such scientific evidence into court.

On March 23, 1999, the Supreme Court clarified in *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 141, 119 S.Ct. 1167, 143 L.Ed.2d 238 [1999] that, in addition to scientific knowledge, "technical" or "other specialized knowledge"-such as engineering-offered as evidence is also subject to the *Daubert* factors of testing, peer review, error rates and "acceptability" in the relevant community where "some or all of which might prove helpful in determining the reliability of a particular scientific 'theory or technique.'" Justice Steven Breyer in writing *Kuraho* went even further in embellishing the judge's role as a gate-keeper to include a review of all technical or other specialized knowledge,



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as well as scientific theories or techniques to determine the validity of the principles and methodology underlying the opinion. A trial judge should review the evidence to ascertain whether it is legally relevant and reliable and helpful to the jury. This process need not be belabored on theories previously found to be generally acceptable which are admissible by judicial notice.

In *Kumho*, the plaintiffs sued the manufacturer of a five year old tire from their minivan which had at least two punctures which had been inadequately repaired.<sup>12</sup>

Despite the tire's age and travel history, a mechanical engineer testifying as an expert witness for the plaintiff concluded that a defect in its manufacture or design caused the blowout.<sup>13</sup> The methodology employed by the mechanical engineer in analyzing the data obtained was merely a visual inspection of the tire. No other testing was done. There were no comparisons to establish a rate of error of this technique or that any peer review generally accepting this technique was ever published. Accordingly, the trial judge precluded the expert opinion of the mechanical engineer. While U.S. Court of Appeals for the Eleventh Circuit reviewed the case *de novo* and determined that the trial court erred in applying *Daubert* standards to non-scientific matters<sup>14</sup>, the U.S. Supreme Court reversed the U.S. Court of Appeals and affirmed the trial court's exclusion of the engineer's opinion.

The New York Experience-New York has not formally adopted the Federal Rules of Evidence (FRE) to include Rule 702 which governs the "testimony by experts." However, New York common law and the New York Civil Practice Law and Rules, (CPLR) contain many of the same principles of evidence contained in the FRE. Indeed, Rule 703, which discusses the "[biases of [o]pinion [t]estimony by [e]xperts", and Rule 705, which discusses "[d]isclosure of [f]acts or [d]ata [u]nderlying [e]xpert [o]pinion", are similar to CPLR § 4515, which states:

Unless the court orders otherwise, questions calling for the opinion of an expert witness need not be hypothetical in form, and the witness may state his opinion and reasons without first specifying the data upon which it is based. Upon cross-examination, he may be required to specify the data and other criteria supporting the opinion.

The New York Court of Appeals has not embraced the *Daubert* standard of scientific reliability, but has retained the *Frye* general acceptance test.<sup>15</sup> The *Frye* test of "general acceptance" is one measured by the scientists of the relevant scientific community to which it belongs.

However, the accelerated pace at which science travels is today far faster than the speed at which it traveled in 1923 when *Frye* was written. Breakthroughs in science which are valid may be relevant to a case before the courts. Waiting for the scientific community to "generally accept" a novel theory which is otherwise valid and reliable as evidence may deny a litigant justice before the court. A trial judge's role as a gatekeeper of evidence is not a role created by *Daubert* and rejected by the Court of Appeals; it is an inherent power of all trial court judges to keep unreliable evidence ("junk science")





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away from the trier of fact regardless of the qualifications of the expert. A well-credentialed expert does not make invalid science valid merely by espousing an opinion.

There are no reported court decisions on the use of biomechanical or biomedical engineers in New York courts; however, biomechanical engineers have been proffered in other jurisdictions. In *Smelser v. Norfolk Southern Railway Co.*, 105 F.3d 299 [6th Cir., 1997, cert. denied 522 U.S. 817, 118 S.Ct. 67, 139 L.Ed.2d 29 (1997)], a federal appellate court held that the trial court erred in allowing an expert to offer his opinion that a defective shoulder belt and not a rear-end collision caused the plaintiff's back injuries. The U.S. Court of Appeals for the Sixth Circuit held (at 301) that the court did not "adequately assess the reliability of the methodology underlying [the expert's] opinions both as to the defect and causation and also failed to recognize that [the expert's] opinion ... went beyond his expertise in biomechanics." The expert in *Smelser* admitted that biomechanical engineers can opine as to how a hypothetical person's body will respond to forces, but they are not qualified to render medical opinions regarding the precise cause of a specific injury. While *Smelser* was under the federal Daubert standard, the rationale is similar to this court's holding.

Two Arizona Superior Court judges in separate opinions have also refused to admit the opinion of a biomechanic that the plaintiffs could not have sustained the injuries which they have documented and complained of from low impact automobile accidents. In the first of these cases, *Yorston v. Bailey* (CV 95-17659, Ariz.Super. Ct., Maricopa Cty., July 31, 1997) Judge Steven Sheldon, while recognizing that a Frye test was required in order to admit novel scientific evidence, held that an expert should possess a specialized knowledge which is beyond the understanding of the average jury and that the opinion should be able to assist the jurors in determining the ultimate issue. The trial judge concluded that low impact automobile accidents were not so specialized that jurors would be unfamiliar with them and, accordingly, the biomechanical expert should not tell the jury how they should decide the case. Thus, the opinion of the biomechanical expert was precluded.

The other case is *Pinsker v. Cohen* (CV 95-12419, Ariz.Super. Ct., Maricopa Cty., Sept. 22, 1997), decided by Judge William T. Maroney, who ruled that Dr. McNish, a biomechanical expert who was a graduate engineer and a physician, could not testify before the jury. Dr. McNish relied upon his knowledge of physics and mechanics and on National Safety Board data for the strength of the relevant impacting vehicle parts and concluded that the insignificant forces to the neck of the plaintiff could not have caused his herniated disk. The doctor also relied on studies performed by him and his co-worker to assess the forces from a staged low-impact collision to conclude that the plaintiff could not have sustained the injury he claims. The court ruled that such study was not professionally challenged, and therefore did not meet the Frye test as being generally recognized in the scientific community. More-over, the court found that such a test commissioned by the defense was so biased that it should not be presented to the jury. Lastly, the court concluded that Frye requires that the "question involved. . . not lie within the range of common experience or common knowledge." The trial judge also recognized the Daubert standard and attempted to apply the proffered evidence to that test which it also failed. Therefore, the opinion of the biomechanical



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expert was precluded.

Conclusion-There may be more than one valid scientific or technical opinion on a particular point which may be generally accepted by the relevant scientific community. The opinions presented need not be the majority opinion. There may be valid minority opinions which are scientifically valid which may rightfully be presented to the trier of fact. But, when the methodology of the minority opinion has not been scientifically tested or has not been critically reviewed or assessed in relevant scientific or technical journals by professionals in the same field, then it is the judge's role to keep such untested, unreliable evidence out of court proceedings. Courts are not laboratories in which to try out new theories to ascertain whether jurors will believe them or not. Theories do not gain general acceptance in the relevant scientific community merely because some jurors accepted a theory as plausible. It is the role of the judge to spend time screening a novel theory or technique before having it presented to a jury.

Using repair costs and photographs as a method for calculating the change in velocity of two vehicles at impact is not a generally accepted method in any relevant field of engineering or under the laws of physics. Hence, under the Frye test of general acceptance, the opinion upon which it relies is inadmissible. By applying the Daubert/Kumho factors this court also finds this methodology to be invalid. The engineer acknowledged that this was a method that he developed which has not been scientifically tested. Indeed, the engineer, when questioned by this court whether there was any literature supporting this method of calculating change in velocity, claimed there was none.

Accordingly, this court finds that the proffered biomedical engineer is qualified as an expert in biomedical engineering based upon his professional training and may render an opinion as to the general formula of forces upon objects provided he uses the facts in evidence.

However, he may not render an opinion based upon his report and testimony at the Frye hearing because the source of the data and the methodology employed by him in reaching his conclusion is not generally accepted in the relevant scientific or technical community to which it belongs. Moreover, applying the Daubert/Kumho factors to the proposed opinion, this court finds that the data and the methodology employed by the biomechanical engineer are not scientifically or technically valid. Therefore, such testimony is not reliable and may not be presented to the jury. Lastly, a biomechanical engineer lacks the training and experience to testify that the plain-tiff did not sustain "serious injuries" as a result of this accident. Hence, the expert opinion is precluded from presentation to the jury.

[Portions of opinion omitted for purposes of publication.]

1. Frye v. U.S., 293 F. 1013 (D.C.Cir.1923).

2. . See, Thomas J. Szabo and Judson B. Welcher, et al., Human Subject Kinematics and Electromyographic Activity





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During Low Speed Rear Impacts, Society of Automotive Engineers, Inc. (1996); Whitman E. McConnell and Richard P. Howard, et al., Human Head and Neck Kinematics After Low Velocity Rear-End Impacts-Understanding "Whiplash," Society of Automotive Engineers, Inc. (1995); Whitman E. McConnell and Richard P. Howard, et al., Analysis of Human Test Subject Kinematic Responses to Low Velocity Rear End Impacts, SAE: The Engineering Society for Advancing Mobility Land Sea Air and Space International (1993); Thomas J. Szabo and Judson B. Welcher, et al., Human Occupant Kinematic Response to Low Speed Rear-End Impacts, SAE: The Engineering Society for Advancing Mobility Land Sea Air and Space International (1994).

3. See, David L. Faigman, et al., Modern Scientific Evidence: The Law and Science of Expert Testimony, v.ol. 1 at 6 (1997).

4. Rule 702: Testimony by Experts. 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.

5. Daubert, 509 U.S. at 590, 113 S.Ct. 2786, 125 L.Ed.2d 469 quoting Webster's Third New International Dictionary 1252 (1986).

6. Id. at 590-591, 113 S.Ct. 2786, 125 L.Ed.2d 469.

7. Id. at 593-594, 113 S.Ct. 2786, 125 L.Ed.2d 469.

8. Id. at 594, 113 S.Ct. 2786, 125 L.Ed.2d 469.

9. Id.

10. Id. at 597, 113 S.Ct. 2786, 125 L.Ed.2d 469.

11. Daubert v. Merrell Dow Pharmaceuticals Inc., 43 F.3d 1311, 1317 (9th Cir.1995).

12. Kumho, supra, at 143, 119 S.Ct. at 1172.

13. Supra, at 144-145, 119 S.Ct. at 1172-73.

14. Carmichael v. Samyang Tire Inc., 131 F.3d 1433 (11 Cir.1997).

15. People v. Wesley, 83 N.Y.2d 417, 611 N.Y.S.2d 97, 633 N.E.2d 451 (1994).

