

Title:**A Picture is Worth a Thousand Words: Using Visuals at Trials and International Arbitrations****Key Takeaways:**

1. Think about visualizations for the jury/court/arbitration early in report writing.
2. Rule 702 changes increase importance of being able to explain expert's work to the court.
3. Numerous types of scientific imaging exist. It is important to know all tools available for both best scientific results and ability to explain results.

Abstract:

A critical component of expert witness testimony is succinctly establishing the bases for the expert's opinions in a manner that is easily understood. This is particularly important for scientific expert witnesses where jurors or the tribunal may be unfamiliar with the subject matter.

Visualizations are one of the best means for experts to convey principles, methods, and data. Images can make testing come to life, schematics can lay out concepts, and plots can relay data more convincingly than verbal descriptions. Additionally, numerous methods of scientific imaging are becoming more accessible and understandable. Examples range from micro-CT scanning at sub-millimeter resolution to electrical methods such as lock-in thermography. Computational methods can also be used to illustrate events through animations. Having familiarity with the range of scientific measurement and imaging techniques, including their strengths and limitations, is important during expert discovery and aids in accurate and engaging expert testimony. In addition, having in mind the visualizations desired for trial or arbitration during the time the expert report is prepared is important to ensure that the disclosure requirements are met. Methods of portraying and relating to data, along with discussion of budget and timing associated with relevant imaging techniques, will be presented during the panel.

Furthermore, the recent Rule 702 amendments increase the importance of being able to thoroughly explain an expert's principles and methods. Visualizations can again be critical to explain an expert's work, demonstrate that the expert's knowledge will assist the jury, and that scientific principles and methods were reliably applied.

Panelists:

1. Paul Briant, Exponent
2. James Haase, Immersion Legal
3. Michelle Schaffer, Campbell Conroy & O'Neil
4. Mark Nash, Nelson Mullins

A Picture is Worth a Thousand Words: Using Visuals at Trials and International Arbitrations

Providing both scientific and engaging expert witness testimony

Introduction

Expert witnesses can provide important testimony that form the foundation of an argument in a dispute. However, if the concepts and opinions put forth by the expert are not readily understood or retained by the jury, judge, or tribunal, the testimony may lose its impact and meaning. Therefore, succinctly laying out an expert's opinions in a manner that tells a story and is easily understood is important, especially for scientific expert witnesses where the audience may be unfamiliar with the subject matter.

Visualizations are one of the best means for experts to convey principles, methods, and information. A study by Weiss and McGrath demonstrated that visual presentation of evidence results in better information retention than oral evidence and that shown that a combination of oral and visual presentation leads to the best information retention.¹ In a 2009 study, Katie Lindner, et al. demonstrated that "visual learning resulted in significantly higher scores in both the immediate and delayed posttest conditions" and that the "use of visual learning mechanisms, rather than auditory learning mechanisms, produces greater learning and memory recall."² The increased retention associated with visual evidence is likely due in part to the testimony being more engaging, which makes the information easier to understand and improves perception of the information. In addition, using visualization and visual evidence can lead to increased credibility for a witness since jurors are allowed to "see it with their own eyes," rather than being told something and relying on trust.

Overview of Types of Visualizations and Differences between Trials, Hearings, and Arbitrations

Visualizations may take many different forms, from simple/rudimentary devices such as flip charts, whiteboards, and ELMOs, to more sophisticated devices such as dynamic graphs, evolving chronologies, or high-tech medical imaging.

Lawyers and their experts should be mindful of the issues related to selecting the appropriate type of visualization for their presentation. Practical considerations include whether the courtroom (or other venue) has appropriate equipment or technology for the medium the lawyer wishes to use, or whether there are any venue-specific rules or requirements for displaying the content (particularly if it is before a jury). Other considerations may include the type of image to use (realistic vs. animation), how best to present data (graphs, pie charts, etc.), or how best to communicate scale (e.g., size, volume) so the audience can relate to the data. The panelists will

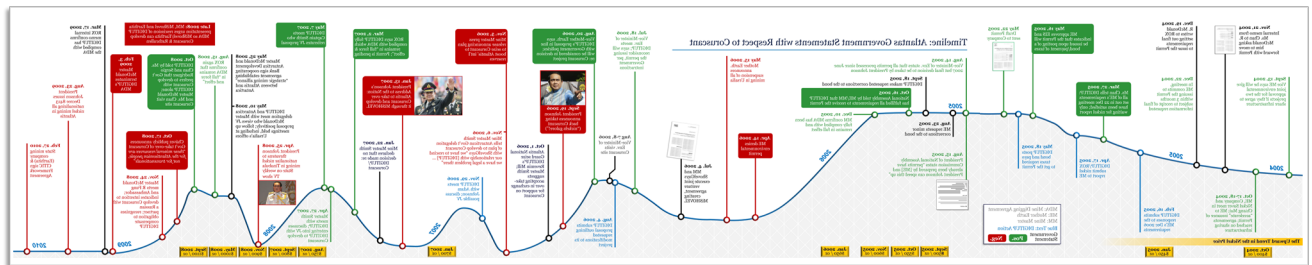
¹ Harold Weiss & J.B. McGrath, Jr., *Technically Speaking: Oral Communication for Engineers, Scientists and Technical Personnel* (1963).

² Lindner, Katie; Blosser, Greta; and Cunigan, Kris (2009) "Visual versus auditory learning and memory recall performance on short-term versus long-term tests," *Modern Psychological Studies: Vol. 15 : No. 1* , Article 6.

address the myriad issues that may arise as lawyers and their experts decide how to visually present to their audience.

Of course, consideration of the audience who will consume the visual content presented is of utmost importance. A jury, with perhaps an average of a high-school level education, will assess scientific content / opinions much differently than a judge, arbitrator, or government agency official.

For example, chronologies may play an important role in a presentation. Detailed events, dates, and facts may be too much information for an average juror to assess (particularly if the information is presented on a PowerPoint slide for a brief period of time), but they may be vitally important for an arbitrator who may have weeks or months to review the information. The below example was prepared for an international dispute before a panel of arbitrators. It was provided to the arbitrators in a print-out / foldout format, and it continued to have an impact long after the arbitration hearing concluded.

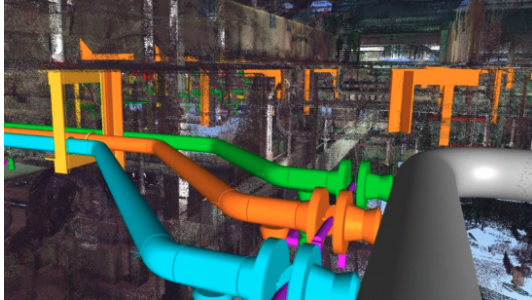
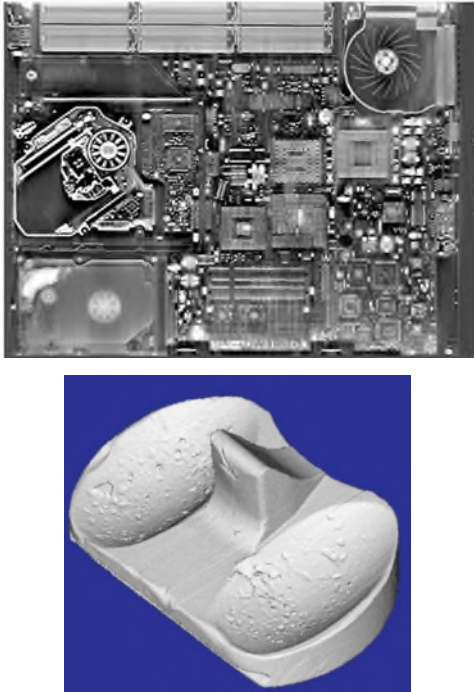
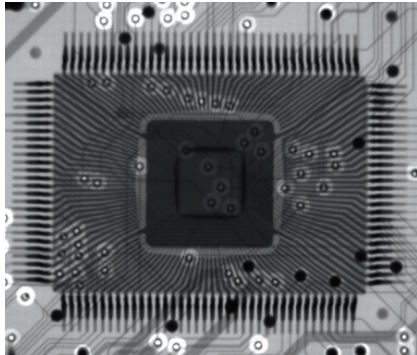


In this example, a Canadian mining company had an agreement with a South American company to mine a valuable element. Before the first shovel digs, millions of dollars were spent on studies and preparations. In this chronology, one can see that the chronology bar is not a straight line. Every time the line goes up, it represents a time where the government continued to communicate in good faith and confirm that the mining company would have the rights to mine. Anytime the line goes down, it represents a time when the government waffled and said that maybe the president changed his mind and they wouldn't get the rights. In the end, you have a compelling visual of the up and down communications for a multi-billion dollar collaboration that the arbitrators were able to use to make their decision. The arbitrators awarded the mining company / client \$1.3B, which was a record award for a mining dispute at that time. The arbitrators repeatedly mentioned the "Rollercoaster" of communications when explaining their award.

Discussion of Scientific Imaging

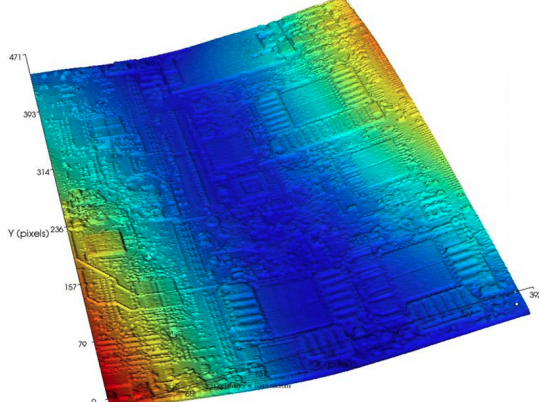
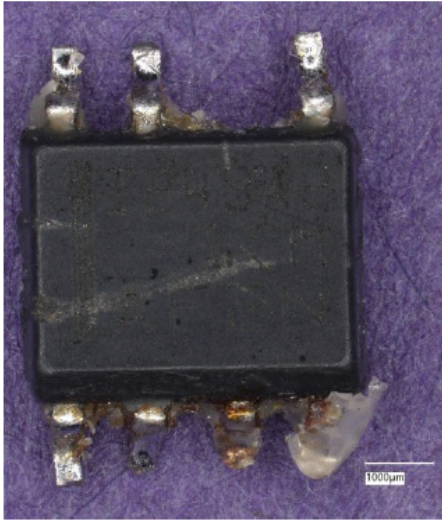
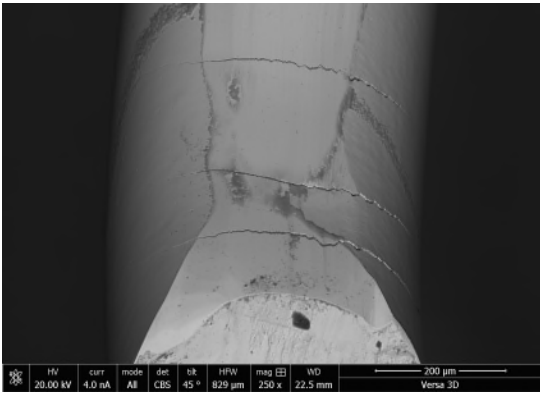
For scientific expert witnesses, the range of visualizations extend beyond schematics and diagrams to scientific imaging techniques. Scientific imaging often serves as both a basis for an expert's opinion and can provide demonstrative evidence. Having familiarity with the range of scientific measurement and imaging techniques, including their strengths and limitations, is important during expert discovery and aids in accurate and engaging expert testimony. Table 1 and Table 2 below show several examples of scientific imaging that range in both subject matter size and precision.

Table 1: Scientific Imaging Methods for Larger Systems or Devices

Imaging Method	Example Image	Description
3D Laser Scanning ³		<p>Laser scanning is used to obtain accurate geometry of devices ranging from piping systems to wheelchairs to handheld devices. It is a versatile tool for creating visualizations and preserving the state of systems for later review.</p> <p>Typical Subject Matter Size: Feet to 100's of Yards</p> <p>Typical Resolution: Depends on scan area, but can be millimeter scale</p>
Computed Tomography (CT) Scanning		<p>Unlike laser scanning, CT scanning is X-ray based imaging method and can be used view components inside a larger assembly that can directly seen. It can also be used to generate scans for evaluating surface characteristics.</p> <p>Typical Subject Matter Size: Sub-inch to a few feet</p> <p>Typical Resolution: 0.001 inches or smaller</p>
2D X-Ray		<p>2D X-ray is another imaging method for visualizing internal components without having to disassembly a device. It provides only a 2D view of an object, but is faster and cheaper than CT scanning.</p> <p>Typical Subject Matter Size: Sub-inch to a foot</p> <p>Typical Resolution: 0.01 inches</p>

³ Image source: enerfab.com

Table 2: Microscopic Scientific Imaging Methods

Imaging Method	Example Image	Description
<p>Profilometry</p>		<p>Profilometry is used to evaluate changes in vertical height at high resolution. Measuring device warping or surface roughness are common examples.</p> <p>Typical Subject Matter Size: Inches</p> <p>Typical Resolution: Below 0.001 inch</p>
<p>Optical Microscopy</p>		<p>Optical microscopy can be used to image the surface of objects at relatively high magnification. Since it is light based, color can be viewed and it is faster and cheaper SEM.</p> <p>Typical Subject Matter Size: Less than 1 foot</p> <p>Typical Resolution: 0.001 inches or smaller</p>
<p>Scanning electron microscopy (SEM)</p>		<p>SEM is the most common form of electron microscopy. Due its large depth of field, it can provide images that are easy to interpret and at high resolution.</p> <p>Typical Subject Matter Size: Less than 6 inches</p> <p>Typical Resolution: 0.00001 inches</p>

In addition to the above experimental imaging methods, computational modeling can be used by scientific experts to both support opinions and provide useful demonstrative evidence. With computational modeling, parameters can be quantified that are difficult to measure experimentally, “what-if” scenarios can be performed easily, and both images and animations

that are brightly colored can be generated. When combined with experimental evidence, computational models can be used to tell the jury a story in an effective manner. Example images of two common computational images (finite element analysis and computational fluid dynamics) are shown below.



Figure 1: Finite element model showing chassis components during impact

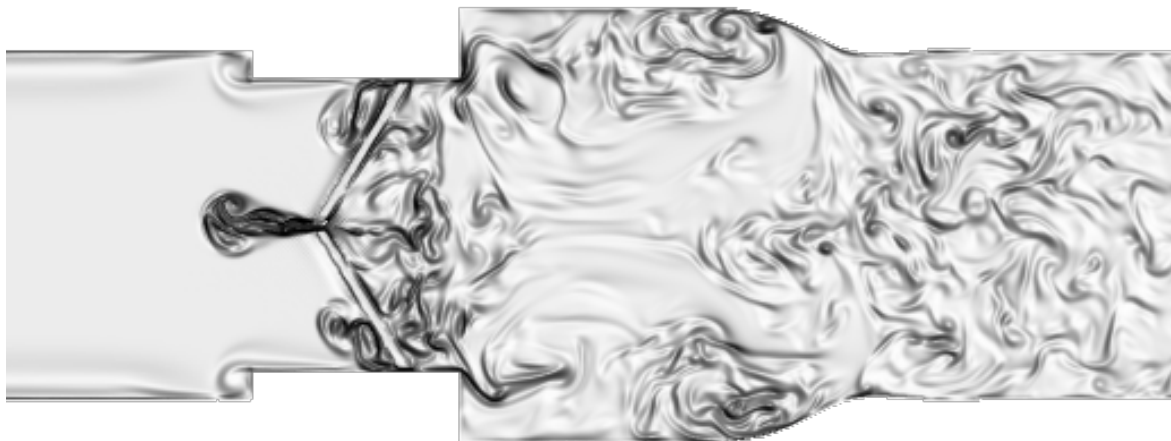


Figure 2: Computational fluid dynamics simulation of flow through an orifice showing resultant turbulent flow

An Overview of the Amendments to Federal Rule of Evidence 702⁴

Introduction

After more than five years of effort, the federal judiciary’s Advisory Committee on Rules of Practice and Procedure approved amendments to Federal Rule of Evidence 702 and these amendments took effect on December 1, 2023. Despite the Advisory Committee’s insistence that the amendments do not substantively change the rule, but are “intended to clarify” the standard

⁴ The panelists are extremely grateful to Frederick E. Pierce, associate attorney at Campbell Conroy & O’Neil, for his assistance in preparing this portion of the written CLE material.

governing the admissibility of expert testimony under Rule 702, in practice, the amendments will alter how parties must approach expert testimony at trial.⁵ The following discusses the substantive amendments to Rule 702, the concerns that brought about the amendments, how some courts are applying the amendments, and offers some practice points to consider when proffering or opposing the proffer of expert testimony.

Amended Rule 702

As amended, Rule 702 prescribes as follows (underlined text was added by the amendments; deleted language is denoted by strikethroughs in the text):

Rule 702. Testimony by expert witnesses.

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if the proponent demonstrates to the court that it is more likely than not that:

- a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- b) the testimony is based on sufficient facts or data;
- c) the testimony is the product of reliable principles and methods; and
- d) ~~the expert has reliably applied~~ the expert's opinion reflects a reliable application of the principles and methods to the facts of the case.

The amendments are intended to address a number of the Committee's concerns regarding the way in which courts have been addressing expert opinion testimony admissibility. First, the committee sought to enshrine that the four elements of Rule 702 that a proponent of expert testimony must satisfy to be admitted into evidence *do not pose questions that pertain to the weight of the evidence*, but of the reliability thereof. In adding the language to the preamble of Rule 702, and placing the onus on the proponent to demonstrate that all four questions are met, the Committee made explicit that judges must ensure that these questions are satisfied prior to going to the jury. This particular change arises from the Committee's concern at the tendency by trial courts to admit expert testimony in the first instance—whether or not reliability has been demonstrated—and allow the process of cross-examination to elucidate deficiencies with the proffered opinions, ultimately leaving the determination of reliability to the jury. “Many courts have declared that the reliability requirements set forth in Rule 702(b) and (d) --- that the expert has relied on sufficient facts or data and has reliably applied a reliable methodology --- are questions of weight and not admissibility, and more broadly that expert testimony is presumed to be admissible. These statements misstate Rule 702, because its admissibility requirements must be established to a court by a preponderance of the evidence. . . .”⁶

Additionally, the Committee affirmatively set forth that judges must apply a preponderance of the evidence standard in assessing whether the four elements of Rule 702 are satisfied in making the admissibility determination. The Committee noted that, as to Fed. R. Evid 702 (b) through (d), “the three reliability-based requirements added in 2000,”⁷ several courts have misinterpreted the standard for those elements and had applied the more permissible standard provided in Fed.

⁵ Comm. on Rules of Prac. of Proc., *June 7, 2022 Agenda Book* 895

⁶ *Id.* at 871.

⁷ FED. R. EVID. 702 advisory committee's notes to 2023 amendment.

R. Evid. 104(b). Although the amended rule utilizes the language “more likely than not,”⁸ the Committee Notes explicitly provide that the standard is a preponderance of the evidence: [Rule 702] has been amended to clarify and emphasize that expert testimony may not be admitted unless the proponent demonstrates to the court that it is more likely than not that the proffered testimony meets the admissibility requirements set forth in the rule. *See* Rule 104(a). This is the preponderance of the evidence standard that applies to most of the admissibility requirements set forth in the evidence rules.⁹

Even under the preponderance of the evidence standard, the Committee contemplated that inevitably, some challenges to expert testimony “*will raise matters of weight rather than admissibility*,”¹⁰ such as where a judge finds it more likely than not that an expert has a sufficient basis in support of an opinion, despite not having read every study germane to it. Notwithstanding that, however, these scenarios do not mean that “arguments about the sufficiency of an expert's basis always go to weight and not admissibility. Rather it means that once the court has found it more likely than not that the admissibility requirement has been met, any attack by the opponent will go only to the weight of the evidence.”¹¹ Importantly, however, in affirming that Rule 702 is governed by the preponderance of the evidence standard, the Committee expressed that it had “no intent to raise any negative inference regarding the applicability of the Rule 104(a) standard of proof for other rules.”¹² The necessity to emphasize the preponderance standard in Rule 702 was due to the many courts which failed to correctly apply its reliability elements. Furthermore, the Committee clarified that the amendments to Rule 702 do not “require that the court make a finding of reliability in the absence of objection.”¹³

The Committee also sought to prevent expert overstatement, reflected in the amendment to Rule 702(d). With respect thereto, the Committee underscored that the amendment reflects that an expert’s opinion must remain within the scope of what can reasonably be concluded from a reliable application of that expert’s methodology and basis. The Committee observed that: [J]ust as jurors may be unable, due to lack of specialized knowledge, to evaluate meaningfully the reliability of scientific and other methods underlying expert opinion, jurors may also lack the specialized knowledge to determine whether the conclusions of an expert go beyond what the expert’s basis and methodology may reliably support.¹⁴ Additionally, the Committee noted that “[t]he language of the [Rule 702(d)] amendment more clearly empowers the court to pass judgment on the conclusion that the expert has drawn from the methodology,” which is consistent with *General Electric Co., v. Joiner*, 522 U.S. 136 (1997), where the Supreme Court held that a trial court must consider both the expert’s methodology *and* the expert’s conclusion, because the methodology must not only be reliable, but must also be reliably applied.

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.*

¹² *Id.*

¹³ *Id.*

¹⁴ Comm. on Rules of Prac. of Proc., *June 7, 2022 Agenda Book* 871.

The Amendments to Rule 702 Have Already Impacted Cases

Courts were already applying proposed amended Rule 702 since prior to December 1, 2023. For example, in *Sardis v. Overhead Door Corp.*, 10 F.4th 268 (4th Cir. 2021), a products liability case, the defendant moved *in limine* to exclude the testimony of two of the plaintiff's experts. The district court denied the motion holding that concerns regarding the reliability of the offered testimony went to the weight of the evidence, not to its admissibility.

The Fourth Circuit Court of Appeals reversed and held that the district court improperly had "cursorily dismissed" the defendant's "reliability and relevance arguments as only going to weight, not admissibility" of the proffered evidence. *Id.* at 282. The Court observed that the trial court had not undertaken any *Daubert* analysis, did not use *Daubert's* guideposts and did not make reliability findings. *Id.* The trial court had improperly and "reflexively" found that that the defendant's arguments seeking to preclude the evidence went to the "weight the jury should afford [the] testimony, not its admissibility" and had abandoned its gatekeeping function, thereby abusing its discretion. *Id.* The *Sardis* Court cited to the Advisory Committee's proposed Amendments, opining that they are aligned with the current law on the admissibility of expert testimony: "Consistent with . . . existing law—and in accordance with the Committee's pending [amendments to Rule 702]—we confirm once again the indispensable nature of district courts' [Rule] 702 gatekeeping function in all cases in which expert testimony is challenged on relevance and/or reliability grounds." *Id.* at 284. Thus, the amendments can be interpreted to strengthen *Daubert's* prescribed guideposts that judges must apply when assessing the admissibility of expert testimony pursuant to Rule 702. *See Bishop v. Triumph Motorcycles (Am.) Ltd.*, No. 3:18-CV-186, 2021 WL 4316810 (N.D.W.Va. Sept. 22, 2021), *aff'd*, No. 21-2113, 2022 WL 17103710 (4th Cir. Nov. 22, 2022) (citing the proposed amendments to Rule 702 and granting the defendant's motion to exclude expert testimony where the court deemed the proffered testimony unreliable due to the lack of physical evidence, test data or relevant literature supporting the expert's conclusions, because the expert performed no tests and conducted no accident replications).

Navigating Expert Opinion Testimony under Amended Rule 702

Because the Amendments were enacted to clarify, rather than substantively alter Rule 702, it is expected that the greatest impact they will have relates to how trial judges will evaluate challenges to expert testimony under the rule. Practitioners should expect greater scrutiny and be prepared to demonstrate how the proffered testimony meets each of the criteria in the rule. When proffering expert testimony, care should be taken to so that expert reports are drafted to ensure proper discussion as to each of the subsections of the rule, and experts should be ready to affirmatively offer testimony in a Rule 104 hearing that meets these requirements. When challenging expert testimony, practitioners likewise should focus argument on the deficiencies in the expert report and the expert's failure to demonstrate reliability through the subsections of the rule. Practitioners should be prepared to remind judges of the heightened requirements for admissibility and that it would be improper to allow expert testimony where the proponent has not met these requirements. No longer is it sufficient for a court to admit marginal expert testimony and have the jury discern reliability, as that role is to be maintained by the trial judge.