Science on Trial

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In a San Diego courtroom last year, experienced patent attorney and Cornell Law School alumnus William F. Lee, J.D./M.B.A. ’76, faced the federal jury that would decide a multimillion dollar case between two giant computer manufacturers. His client, Broadcom, chip maker for Apple’s video iPods and high definition DVDs, was defending itself against a patent infringement lawsuit by Qualcomm. As the case developed, the complexity of the technical evidence became more and more apparent. Jurors in the case had to master enough of the specialized testimony about the video compression process to be able to assess the competing claims of the two adversaries. Reporters attending the trial characterized the forty-plus hours of technical and scientific evidence as “akin to a graduate-level college course on video compression.”

Could a lay jury handle the challenge? In fact, the jury reached its verdict exonerating Broadcom in just six hours. The foreman observed after trial that, although the jurors were not “all electrical engineers,” they listened carefully to the evidence, took notes, and entered the deliberation room with a solid comprehension of the evidence.

The Qualcomm-Broadcom patent case is distinctive because of its size and national significance. Yet it illustrates a growing reality. The increasing complexity of both criminal and civil jury trials raises a host of issues for lawyers and judges. For the litigator, the first question is whether a jury can be trusted with a case that turns on highly technical evidence. Should lawyers routinely opt for judge trials in complex cases? If a jury trial is chosen, how should expert witnesses be prepared so they can testify most effectively? Are some prospective jurors so hostile to science that they are unlikely to hear expert evidence with an open mind? For the trial judge, there are decisions about the admissibility of expert testimony, whether it is based on sound science, and whether a jury is likely to be misled by scientific claims. Should the judge permit jury innovations such as note...
The increasing complexity of both criminal and civil jury trials raises a host of issues for lawyers and judges. For the litigator, the first question is whether a jury can be trusted with a case that turns on highly technical evidence.
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Taking, question asking, and juror discussions of evidence during the trial, hoping to increase jury comprehension of the scientific claims being advanced by the experts?

Over the past several years, I’ve been investigating the topic of jurors and scientific evidence in the courtroom. I’ve studied how jurors confront the task of understanding expert testimony that is outside their knowledge and experience. I’ve also explored whether jury trial innovations can help jurors master complicated scientific and technical material. Most recently, I’ve had a chance to ask similar questions about judges’ reactions to scientific evidence in the courtroom. Results from these studies are reported in a series of articles and in a recent book I coauthored with Duke Law School professor Neil Vidmar, *American Juries: The Verdict* (Prometheus Books, 2007) [see sidebar].

A central piece of my research on juries and science came from a collaborative project conducted with the Arizona state court trial judge B. Michael Dann (now retired), a true jury-centric judge and a tireless advocate for making jury trials more like educational settings. To study jurors’ responses to scientific evidence and whether trial reforms could improve jury comprehension and use of scientific evidence, our research team conducted a mock jury study using a case with scientific evidence (the Jury MtDNA Study). The mock trial was adapted from a real criminal case in Connecticut. Our version included dueling scientific expert testimony about mitochondrial DNA (mtDNA) evidence that linked hairs from the sweatshirt of a fleeing robber to the defendant in the case.

Typically, forensic DNA testing employs strands of nuclear DNA, but when the quantity or quality of nuclear DNA is insufficient for analysis, mitochondrial DNA analysis may be used. It has been employed for a variety of purposes, including confirming the last of the Romanovs as well as identifying remains at the World Trade Center following the 9/11 disaster. The two types of DNA differ. Compared to nuclear DNA, the mtDNA sequence is shorter and fewer base pairs are used in the analysis of a match. Furthermore, mitochondrial DNA is passed through the maternal line of descent, so everyone in the same maternal line has identical mtDNA. For these reasons, mtDNA matches are not as definitive as nuclear DNA matches, although it has proven to be useful forensically and is now routinely accepted in U.S. courts.

At the time of the Jury MtDNA Study, mitochondrial DNA was not widely used in forensic contexts and many people knew little about it. This allowed us to examine how jurors respond to novel scientific evidence. Yet mtDNA bears a resemblance to the more familiar nuclear DNA. Does that provide a useful context or are jurors confused?

In the Jury MtDNA Study, 480 members of a Delaware jury pool (who were not needed for a trial that day) met in groups of eight at the courthouse and watched a videotape of the mock trial. The study varied whether mock jurors were able to use specific trial innovations. Jurors answered true-false and other questions regarding the scientific evidence presented by the adversarial experts. We examined jury comprehension of the scientific evidence, and whether innovations helped the jurors.

The American Bar Association’s *Principles for Juries and Jury Trials* (2005) encourages the use of a number of jury trial innovations to improve juror comprehension of evidence. The ABA’s recommendations are based on substantial research showing positive effects...
on jury decision making. The Jury MtDNA Study examined whether specific innovations could help jurors comprehend and use complex scientific evidence. It varied whether the jurors could employ note taking, ask questions about the scientific evidence, employ a checklist, use a jury notebook, or use multiple innovations. Some jurors were able to employ just one of these techniques, other jurors were allowed two or more, and some jurors were allowed none of the innovations, serving as controls. We asked jurors whether the innovations helped them remember and understand the expert evidence. We also tested whether using any of these innovations positively affected their comprehension on the true-false questions.

Reassuringly, jurors performed reasonably well on the true-false tests examining their comprehension of basic biological facts about mtDNA, including questions about the location of the mitochondria within the cell, the sequence of base pairs, and the maternal heritage of mtDNA. Questions were also included about the inferences that could be drawn from an mtDNA match. Solid majorities of jurors responded correctly to most items about the scientific material presented during the expert testimony. Jurors appeared to have somewhat more difficulty dismissing exaggerated claims made by opposing counsel, for example, that mtDNA evidence was “completely irrelevant” because a number of other people could be potential sources. Jury deliberation significantly improved comprehension.

Jurors were very positive about being permitted to use the trial techniques. They reported that they benefited from employing the innovations. The true-false test showed mixed results for the jury reforms. Two innovations—checklists and jury notebooks—showed small yet statistically significant benefits on juror comprehension as measured by the set of true-false questions. The Jury MtDNA Study did not confirm comprehension benefits from note taking or question asking, although other researchers have concluded that both can be effective techniques. Jurors in the MtDNA study reported that note taking was primarily helpful as a memory aid, and the experiment was much shorter than a typical trial. Only a small number of jurors posed questions about the scientific testimony (answered by experts via cell phone) so that may explain why questions produced no discernible impact on overall juror comprehension.

The jurors’ reasonably good comprehension of the scientific evidence, and the fact that some of the innovations produced significant improvements, suggest that a jury trial is a sound choice for a complex case, and that trial innovations are worthwhile. However, the Jury MtDNA Study also indicates that we should explore a wider range of innovations that judges and lawyers could employ in especially complicated cases.

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Some differences emerged on how judges as a group and jurors as a group evaluated the mtDNA evidence offered by the prosecution in the trial. Although majorities of both judges and jurors saw the evidence as reliable and the likelihood it was contaminated as low, jurors expressed more concern than judges about reliability and contamination.

There are limitations to the generalizability of this judge-jury comparison, since it contrasted one national group of judges attending a conference with one group of jurors from a single jurisdiction. Nonetheless, it is intriguing that in terms of scientific evidence, the two groups show substantial overlap. A pattern of basic similarity along with specific areas of divergence between judges and jurors has been found in other research projects.

With complex evidence, it’s worth thinking about how to make the courtroom more like a classroom, albeit one with lessons that have a vibrant adversarial twist. In a jury trial, litigators would be wise to anticipate that the presiding judge and the jury will take distinctive approaches to some of the evidence. The jury’s command of material is fostered by the court’s encouragement of active decision making with innovative trial techniques, and by litigators who take diverse perspectives into account in their case presentation.

Valerie P. Hans is a professor of law at Cornell Law School.

From the book jacket: Although the right to trial by jury is enshrined in the U.S. Constitution, in recent years both criminal and civil juries have been criticized as incompetent, biased, and irresponsible. For example, the O.J. Simpson criminal jury’s verdict produced a racial divide in opinions about that trial. And many Americans still hold strong views about the jury that awarded millions of dollars to a woman who spilled a cup of McDonald’s coffee on herself. It’s said that there are “judicial hellholes” where local juries provide “jackpot justice” in medical malpractice and product liability cases with corporate defendants. Are these claims valid?

This monumental and comprehensive volume reviews over fifty years of empirical research on civil and criminal juries and returns a verdict that strongly supports the jury system. Rather than relying on anecdotes, Vidmar and Hans—renowned scholars of the jury system—place the jury system in its historical and contemporary context, giving the stories behind important trials while providing fact-based answers to critical questions. How do juries make decisions and how do their verdicts compare to those of trial judges and technical experts? What roles do jury consultants play in influencing trial outcomes? Can juries understand complex expert testimony? Under which circumstances do capital juries decide to sentence a defendant to die? Are juries biased against doctors and big business? Should juries be allowed to give punitive damages? How do juries respond to the insanity defense? Do jurors ignore the law?

Finally, the authors consider various suggestions for improving the way that juries are asked to carry out their duties. After briefly comparing the American jury to its counterparts in other nations, they conclude that our jury system, despite occasional problems, is, on balance, fair and democratic, and should remain an indispensable component of the judicial process for the foreseeable future.

Neil Vidmar is both the Russell M. Robinson II Professor of Law at Duke University School of Law and a professor of psychology at Duke University. He has published over one hundred research articles and is the author, coauthor, or editor of four books including Professors Hans and Vidmar’s widely acclaimed Judging the Jury, and Medical Malpractice and the American Jury, and World Jury Systems.

Valerie P. Hans is a professor of law at Cornell Law School. She has published more than ninety research papers and articles and is the author, coauthor, or editor of five books including Business on Trial, Judging the Jury, and The Jury System. She also serves on the editorial boards of major professional journals in the field of law and social science.

“A highly readable account of the history of this fascinating, unique, and controversial institution—and more important, a sophisticated distillation of the many empirical studies that reveal its true nature and behavior. Anyone who wants to engage seriously in the debates over the jury’s social functions, legitimacy, and actual performance must read this book.”

—Peter H. Schuck, Simeon E. Baldwin Professor of Law, Yale Law School

“Truly the most comprehensive and best researched treatise on the American jury ever written!”

—Jo-Ellan Dimitrius, Trial Consultant