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Foreword

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In the United States[1] and abroad,[2] the use of scientific evidence in court has become controversial. However, several points are reasonably clear. To begin with, it is undeniable that the use of scientific evidence at trial is a growing phenomenon. You need not look far to find evidence of the phenomenon. For example, one item in today's front page news is an article about a Centers for Disease Control (CDC) study.[3] The *USA Today* article refers to research by a CDC epidemiologist indicating that a particular oral vaccine is associated with all the polio cases occurring in the United States between 1980 and 1994. If this research becomes the catalyst for civil lawsuits, you can be cer-

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[1] *Compare* PETER W. HUBER, GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM 4 (1991) (noting that junk science is major problem in modern American courts), *with* Kenneth J. Chesebro, *Galileo's Retort: Peter Huber's Junk Scholarship*, 42 AM. U. L. REV. 1637, 1652-58 (1993) (arguing that Huber overstates extent of junk science problem).

[2] *See* David E. Bernstein, *Junk Science in the United States and the Commonwealth*, 21 YALE J. INT'L L. 123, 138-73 (1996) (discussing use of scientific evidence in England, Canada, and New Zealand).

[3] *See* Tim Friend, *Vaccine Caused Almost All Polio Since '80*, USA TODAY, Jan. 31, 1997, at 1A (discussing Centers for Disease Control's polio study).

tain that the epidemiologist, Rebecca Prevosts, will play an important role as an expert witness in the litigation. The same edition contains a second article,[4] reporting on further revelations of alleged deficiencies in the forensic analyses conducted by the Federal Bureau of Investigation's crime laboratory. You can be assured that this issue will be debated by expert witnesses in criminal cases throughout the United States.

These *USA Today* articles are not isolated instances. One respected commentator has suggested that in the United States, evidentiary hearings are becoming "trial by expert."[5] In the early 1990s, the Rand Corporation released the results of a study of the use of experts in California state trials.[6] The Rand study found that experts appeared as witnesses in eighty-six percent of the trials and that, on the average, there were 3.3 experts per trial.[7]

The paradox, though, is that at the same time the use of scientific testimony is accelerating, we are gaining alarming insights into the level of scientific misanalysis. In some cases, the source of error is reliance on an inadequately validated theory. For example, Peter Huber of the Manhattan Institute released *Galileo's Revenge* in 1991.[8] In his book, Mr. Huber collected numerous case studies of suits in which he claims plaintiffs' attorneys relied on spurious theories of medical causation.[9]

In other cases, the cause of the error is sloppy test procedure. We have powerful new technologies such as DNA typing;[10] but, as one of my undergraduate philosophy professors cautioned, at the laboratory benches we have human beings who are clay up

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[4] *See* Kevin Johnson, *"Confidence" and Problems in Crime Lab*, USA TODAY, Jan. 31, 1997, at 3A (reporting that FBI's crime laboratory has serious problems).

[5] *See* William T. Pizzi, *Expert Testimony in the US*, 145 NEW L.J. 82, 82 (1995) (explaining that experts in modern cases feel more pressure to testify on issues once thought to be in jury's common knowledge).

[6] *See* Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1119-20.

[7] *See id.* at 1119.

[8] *See* HUBER, *supra* note 1.

[9] *See id.* at 39-42; *see also* MARCIA ANGELL, SCIENCE ON TRIAL: THE CLASH OF MEDICAL EVIDENCE AND THE LAW IN THE BREAST IMPLANT CASE 69 (1996) (discussing abundance of breast implant litigation); Marcia Angell, *The Shattuck Lecture — Evaluating the Health Risks of Breast Implants: The Interplay of Medical Science, the Law, and Public Opinion*, 334 NEW. ENG. J. MED. 1513, 1514 (1996) (same).

[10] *See* 2 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, SCIENTIFIC EVIDENCE §§ 18-1 to 18-7 (2d ed. 1993 and Supp. 1996) (discussing recent explosion of interest in DNA typing).

to their eyebrows[11] — and who modernly are often both undertrained and overworked. In the mid-1980s, the CDC sponsored a study of the proficiency of laboratories employing the immunoassay procedure to test for the presence of drugs in urine specimens.[12] One of the laboratories tested had an error rate exceeding sixty percent. Within the past year and a half, three federal courts have held that the findings yielded by questioned document examination[13] and microscopic analysis of hair[14] do not qualify as admissible scientific evidence. In these opinions, the courts pointed to proficiency studies in which the analysts erred on over half the samples submitted for evaluation. These studies lend substance to the accusation that it would be better to flip a coin[15] rather than call on the forensic laboratory.

When a scientist uses an empirically validated technique and applies that technique meticulously, however, it appears reasonably clear that the scientist can make a major contribution to enhancing the integrity of the fact-finding process. In 1996, the Justice Department released a collection of twenty-eight case studies of wrongly-convicted accused who obtained post-conviction relief on the basis of exculpatory DNA tests.[16] The initial Foreword to the text states:

> It is misleading to focus solely on the strengths and weaknesses of scientific evidence. In principle, the judgment must be comparative. To the extent that we discriminate against scientific evidence, subjecting it to uniquely discriminatory,

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[11] *See* Edward J. Imwinkelried, *The Debate in the DNA Cases Over the Foundation for the Admission of Scientific Evidence: The Importance of Human Error as a Cause of Forensic Misanalysis*, 69 WASH. U. L.Q. 19, 21 (1991) (discussing two cases that disallowed DNA typing evidence because of analyst error, even though technique itself is trustworthy).

[12] *See* Hugh J. Hansen et al., *Crisis in Drug Testing: Results of CDC Blind Study*, 253 J. AM. MED. ASS'N 2382, 2382 (1985) (describing CDC's proficiency testing program for evaluating laboratories that conduct drug screens).

[13] *See* United States v. Jones, 107 F.3d 1147, 1157 (6th Cir. 1997); United States v. Starzecpyzel, 880 F. Supp. 1027, 1038 (S.D.N.Y. 1995) (finding that document examination cannot be regarded as "scientific knowledge" under *Daubert*).

[14] *See* Williamson v. Reynolds, 904 F. Supp. 1529, 1554-58 (E.D. Okla. 1995) (discussing inadmissibility of microscopic hair evidence under *Daubert*).

[15] *See* Bruce J. Ennis & Thomas R. Litwack, *Psychiatry and the Presumption of Expertise: Flipping Coins in the Courtroom*, 62 CAL. L. REV. 693, 694-96 (1974) (questioning reliability and validity of psychiatric expert testimony and discussing changes in presumed validity of expert testimony).

[16] *See* EDWARD CONNORS ET AL., CONVICTED BY JURIES, EXONERATED BY SCIENCE 2 (1996) (discussing purpose and scope of Justice Department's study).

> restrictive rules . . . , we encourage the courts to rely on other types of evidence. Thus, our task is not to make an absolute judgment about the merits of scientific evidence. Rather, our task is to compare it with other types of evidence to decide whether the differential treatment of scientific evidence is justifiable.[17]

There is a stack of studies documenting the margin of error in scientific analysis.[18] However, by restricting the admissibility of scientific testimony, we force the trier of fact to depend even more heavily on eyewitness testimony and assessments of witnesses' demeanor; and we could stock a small library with all the studies demonstrating the fallibility of eyewitness testimony[19] and the unreliability of nonverbal demeanor as an indicator of untruthfulness.[20]

Given the alternative — continued reliance on non-scientific types of evidence with demonstrable weaknesses — we should encourage increased resort to scientific testimony *if* we can separate the wheat from the chaff. The question is whether we can distinguish spurious theories from those supported by adequate empirical verification. Can we differentiate between tests conducted in a sloppy fashion and those conducted with rigorous protocol? That is the challenge facing the American courts.

Fortunately, we have discovered that we are not alone in encountering this challenge. Worldwide, courts are confronting the task of identifying "junk science."[21] They have accumulated a body of experience on which American courts may draw to improve our standards and procedures for handling scientific testi-

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[17] *Id.* at xiii-xiv (quoting Edward J. Imwinkelried, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 28 VILL. L. REV. 554, 564 (1983)).

[18] *See, e.g.*, Paul C. Giannelli, *The Admissibility of Laboratory Reports in Criminal Trials: The Reliability of Scientific Proof*, 49 OHIO ST. L.J. 671, 688-92 (1988).

[19] *See, e.g.*, Felice J. Levine & June Louin Tapp, *The Psychology of Criminal Identification: The Gap from* Wade *to* Kirby, 121 U. PA. L. REV. 1079, 1081-82 (1973) (arguing that misidentification of criminal suspects often results in faulty convictions).

[20] *See, e.g.*, Jeremey A. Blumenthal, *A Wipe of the Hands, a Lick of the Lips: The Validity of Demeanor Evidence in Assessing Witness Credibility*, 72 NEB. L. REV. 1157, 1158-59 (1993) (noting that extensive empirical research has been conducted on fact of deception and its supposed detection by observers); Olin Guy Wellborn III, *Demeanor*, 76 CORNELL L. REV. 1075, 1076 (1991) (noting that there are pertinent social science materials on demeanor to suggest appropriate legal response).

[21] *See* Bernstein, *supra* note 2, at 125 (explaining junk science debate in England, Canada, and New Zealand).

mony. That is the purpose of this Symposium; leading authorities from the Netherlands, the United Kingdom, and Australia are here to share their insights into the judicial management of scientific evidence. They each give their perspective on the scientific evidence problems that are common throughout the world.

At first blush, the topic of the admission of scientific testimony seems reducible to three general problems. To decide whether to admit a particular item of scientific evidence, an impartial judge must apply a sound legal admissibility standard to testimony describing a particular forensic technique. Simply stated, all you need are an impartial judge, a sound standard, and comprehensive information about the forensic technique in question. However, that simplicity is deceptive.

We want impartial judges. However, the controversy over "junk science"[22] has become bitter and politically charged. Hence, the judge is likely to come to the issue with at least some preconceptions about the extent of the need to screen out spurious scientific testimony.

We also want a sound admissibility test. That subject, however, is one of the major ongoing disputes in American evidence law. For decades, the overwhelming majority of jurisdictions[23] subscribed to the *Frye*[24] general acceptance standard. In 1993, in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,[25] the United States Supreme Court abandoned that test and substituted an empirical validation standard.[26] Yet twenty-two states remain committed to the traditional *Frye* test.[27] Since the rendition of the Supreme

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[22] *See supra* note 1 (discussing debate over junk science).

[23] *See* 1 GIANNELLI & IMWINKELRIED, *supra* note 10, § 1-5 (stating that majority of federal and state courts formerly applied general acceptance test).

[24] Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).

[25] 509 U.S. 579 (1993).

[26] *See id.* at 587-95 (stating that Federal Rule of Evidence 702 displaced *Frye* test).

[27] *See* Joseph R. Meaney, *From* Frye *to* Daubert*: Is a Pattern Unfolding?*, 35 JURIMETRICS J. 191, 193 (1995).

Court's 1993 decision, several courts,[28] including our own California Supreme Court,[29] have flatly refused to follow the Supreme Court's lead.

Finally, before admitting scientific testimony, we need thorough information about the scientific theory or technique upon which the expert proposes relying. However, different scientific techniques present radically different problems for the courts. It is relatively uncontroversial to admit the testimony of a trace evidence expert who claims only that the fiber found at a crime scene is microscopically similar to the fiber in the carpet at the accused's residence.[30] However, for the court to receive testimony by a DNA typing expert who claims that she can generate a random match probability in the billions is much more problematic.[31] The statistical nature of that claim requires the court to demand from the expert a very different type of validation.

This Symposium is organized into three series of Articles. Each series corresponds to one of the three problem areas. The first series addresses the legal test for determining the admissibility of scientific testimony, and includes Articles by Justice Hans Nijboer of the Court of Appeals of Amsterdam,[32] the Honorable Alex Kozinski of the United States Court of Appeals for the Ninth Circuit,[33] and the Honorable Ronald Tochterman of the California Superior Court for the County of Sacramento.[34] Justice Nijboer served as the president of the First World Congress on Evidence, held at The Hague in late 1995.[35] Judge Kozinski authored both Ninth Circuit opinions in *Daubert* — the initial decision overturned by the Supreme Court[36] and the de-

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[28] *See* 1 GIANNELLI & IMWINKELRIED, *supra* note 10, § 1-5(F) (Supp. 1996) (listing state cases applying *Frye* test).

[29] *See* People v. Leahy, 882 P.2d 321, 337 (Cal. 1994) (stating that *Kelly* doctrine survived *Daubert*).

[30] *See* 2 GIANNELLI & IMWINKELRIED, *supra* note 10, § 24-5 (pointing out that fiber experts routinely testify on microscopic examinations).

[31] *See* 2 *id.*, § 18-5(C) (noting several courts have expressed skepticism of trustworthiness of DNA matches).

[32] *See* Petra van Kampen & Hans Nijboer, Daubert *in the Lowlands*, 30 U.C. DAVIS L. REV. 951 (1997).

[33] *See* Alex Kozinski, *Brave New World*, 30 U.C. DAVIS L. REV. 997 (1997).

[34] *See* Ronald W. Tochterman, Daubert*: A (California) Trial Judge Dissents*, 30 U.C. DAVIS L. REV. 1013 (1997).

[35] PROCEEDINGS OF THE FIRST WORLD CONFERENCE ON NEW TRENDS IN CRIMINAL INVESTIGATION AND EVIDENCE (J.F. Nijober & J.M. Reijntjes eds., 1997).

[36] *See* Daubert v. Merrell Dow Pharms., Inc., 951 F.2d 1128 (9th Cir. 1991), *vacated*, 509

cision on remand.[37] Judge Tochterman has not only presided at several trials involving scientific evidence,[38] he also teaches a course on that subject at McGeorge School of Law. Judge Tochterman has extensive experience applying the *Frye* test and, in his Article, he champions a modified version of that test.[39]

The second series of Articles, written by three law professors, focuses on DNA evidence. Professor Michael Redmayne[40] is a member of the law faculty of the University of Manchester. He is one of the leading European commentators on the legal implications of DNA technology, and he was a presenter on that subject at the World Congress on Evidence. Professor Redmayne's Article is followed by *Laboratory Error Seen Through the Lens of Science and Policy*, authored by Dean Margaret Berger of Brooklyn Law School.[41] Dean Berger is the former Reporter for the Federal Rules of Evidence Advisory Committee and the co-author of *Weinstein's Evidence*,[42] the leading treatise on the Federal Rules. In *Daubert*, she authored the influential amicus brief filed on behalf of the Carnegie Commission;[43] and the Federal Judicial Center later asked her to write the *Evidentiary Framework* chapter for its *Reference Manual on Scientific Evidence*.[44] Last year, she participated as a member of a National Research Council committee, which prepared the report entitled *The Evaluation of Forensic DNA Evidence*.[45] The final contributor to this series is Professor William Thompson of the University of Cali-

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U.S. 579 (1993).

[37] *See* Daubert v. Merrell Dow Pharms., Inc. 43 F.3d 1311 (9th Cir. 1995), *on remand from* 509 U.S. 579 (1993).

[38] *See, e.g., Jury in Trial Over 1987 Murder Will Not Hear DNA Evidence, Local Judge Rules*, SACRAMENTO DAILY RECORDER, Sep. 20, 1991, at 1 (discussing murder and rape prosecution of Paul Steven Mack).

[39] *See* Tochterman, *supra* note 34, *passim*.

[40] *See* Mike Redmayne, *Expert Evidence and Scientific Disagreement*, 30 U.C. DAVIS L. REV. 1027 (1997).

[41] *See* Margaret A. Berger, *Laboratory Error Seen Through the Lens of Science and Policy*, 30 U.C. DAVIS L. REV. 1081 (1997).

[42] *See* JACK B. WEINSTEIN ET AL., WEINSTEIN'S EVIDENCE (1996).

[43] Brief of the Carnegie Commission on Science, Technology, and Govermnet as Amicus Curiae in Support of Neither Party, Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579 (1993) (No. 92-101).

[44] Margaret Berger, *Evidentiary Framework, in* REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 37 (Fed. Judicial Ctr. ed. 1994).

[45] NATIONAL RESEARCH COUNCIL, COMMITTEE ON DNA FORENSIC SCIENCE: AN UPDATE, THE EVALUATION OF FORENSIC DNA EVIDENCE iii (1996).

fornia at Irvine.[46] Professor Thompson is a frequent contributor to the literature on DNA.[47] During the prosecution of O.J. Simpson, Professor Thompson was a member of the successful defense team; and he was instrumental in the preparation of the defense motions dealing with the DNA evidence in that case.

The final series of articles addresses the topic of judicial attitudes toward expert testimony. This series begins with an article by Mr. Ian Freckelton[48] of Australia. Like Professor Redmayne, Mr. Freckelton was a presenter at the World Evidence Congress at The Hague. Mr. Freckelton is the co-editor of *Expert Evidence*, the foremost Australian treatise on scientific testimony. In his Article, Ian Freckelton presents the early returns from a survey of Australian judges' attitudes toward scientific evidence.[49] Several months ago, Mr. Freckelton obtained formal approval from the Australian judiciary to conduct this survey. To my knowledge, this is the first comprehensive, officially sanctioned survey of any judiciary's attitudes on this topic. For decades, the students of scientific evidence have had no choice but to rely on anecdotal evidence of judicial attitudes. However, we are about to have access to a substantial body of systematic research into these attitudes. This is the first survey of its kind anywhere, and Mr. Freckelton's Article is the first public disclosure of the initial results of that survey.

Two distinguished commentators, representing the American civil and criminal bars, respond to Mr. Freckelton's Article. Mr. Marc Klein[50] is a partner in the New Jersey firm of Sills, Cummis, Zuckerman, Radin, Tischman, Epstein & Gross. He has a wealth of experience dealing with scientific witnesses, and he is a co-editor of *Shepard's Expert and Scientific Evidence Quarterly*. For his part, Mr. Ephraim Margolin[51] is one of the most distin-

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[46] *See* William C. Thompson, *A Sociological Perspective on the Science of Forensic DNA Testing*, 30 U.C. DAVIS L. REV. 1113 (1997).

[47] *See, e.g.*, William C. Thompson & Simon Ford, *DNA Typing: Acceptance and Weight of the New Genetic Identification Tests*, 75 VA. L. REV. 45, 48 (1989) (commenting on different tests for DNA typing and discussing issues with regard to reliability).

[48] *See* Ian Freckelton, *Judicial Attitudes Toward Scientific Evidence: The Antipodean Experience*, 30 U.C. DAVIS L. REV. 1137 (1997).

[49] *See id.* at 1212-22.

[50] *See* Marc S. Klein, Daubert*: Worldwide Judicial Management of Humanity's Specialized Knowledge*, 30 U.C. DAVIS L. REV. 1229 (1997).

[51] *See* Ephraim Margolin, Daubert*: Comments on the Scientific Evidence Symposium*, 30 U.C.

guished members of the criminal bar in the United States. He is a past president of the National Association of Criminal Defense Lawyers and the founding president of California Attorneys for Criminal Justice. Like Mr. Klein, Mr. Margolin has had extensive experience with scientific evidence, including testimony about repressed memory and hypnotically-enhanced memory.[52]

The 1995 World Congress on Evidence was the first meeting of its kind. This seminar is the first program of its kind held on American soil. Hopefully, the Congress and this seminar will serve as the impetus for other international meetings on this topic. Justice Nijboer has announced that planning is already under way for a second World Congress. In the short term, of course, it would be unrealistic to expect definitive solutions to the problems posed by the global phenomenon of the increased use of scientific testimony. However, the Articles in this Symposium hold out promise for the longterm; they demonstrate that American and foreign commentators have experience, insight, and imaginative approaches to share. In evaluating problems of civil and criminal procedure, American scholars have learned that we can no longer afford the luxury of parochialism. American Evidence scholars are coming to learn the same lesson. This Symposium has been one of the initial steps in that learning process.

DAVIS L. REV. 1249 (1997).

[52] *See, e.g.*, Quaglino v. California, 23 Crim. L. Rep. (BNA) 4018 (Cal. App. 1977).