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Maintaining the Integrity of Scientific Research and
Forensic Evidence in Criminal Proceedings

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Introduction to the Symposium

Margaret A. Berger

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SCIENCE FOR JUDGES III

INTRODUCTION

*Margaret A. Berger**

The essays that follow are expanded versions of presentations made to federal and state court judges at the third Science for Judges conference, held at Brooklyn Law School in March 2004. These programs, which are funded by the Common Benefit Trust established in the Silicone Breast Implant Products Liability Litigation, are held under the auspices of Brooklyn Law School's Center for Health, Science and Public Policy in collaboration with the Federal Judicial Center, the National Center for State Courts, and the Science, Technology and Law Panel of the National Academies of Science. The program's aim is to examine evolving scientific issues in order to assist judges in handling litigation in their courtrooms, and that goal is certainly achieved by the papers that follow. Although the topics were chosen long before the dates on which the conference took place, recent developments have intensified the significance of the cutting-edge subjects that were discussed.

The first session, Maintaining the Integrity of Scientific Research, dealt with the complexities of relationships within the scientific community that shape the scientific culture in which research is conducted and reported. The extent to which conflicts of interest within the biomedical enterprise skew scientific conclusions and impact public health has lately been a topic of considerable interest to regulators, academics, the media, and the public. Much of this debate was fueled by recent disclosures about failures to release research data regarding the effect of

* Suzanne J. and Norman Miles Professor of Law, Brooklyn Law School. Professor Berger is the Director of the Science for Judges Program.

antidepressants on children¹ and the incidence of heart attacks and strokes following the use of cox-II inhibitors.²

In light of these newsworthy events, two papers that follow are of particular interest. The first³ is by an insider, Dr. David Korn, a prestigious participant in the medical community; the second⁴ is by Professor Sheldon Krimsky, whose research agenda has long focused on linkages between science and public policy. Despite the very different perspectives from which they write, both authors agree that far-reaching changes have resulted in the commercialization of biomedical research and express serious concerns about the implications these changes have for the production of credible science. Dr. Korn endorses a variety of changes directed at managing financial conflicts of interest, but cautions that overzealous efforts may have deleterious consequences with regard to the production of biomedical research. Professor Krimsky's paper focuses on studies published in medical journals that examine the effect of funding on research conclusions. He concludes that the mere disclosure of financial conflicts may be inadequate to protect the integrity of scientific research and cautions judges about biases that may infect a *Daubert* hearing.⁵ Read together, the two papers demonstrate the enormous impact scientific conflicts of interest may have on resolving questions both in and outside the courtroom, and the difficult task judges face in evaluating the research on which experts rely.

David Michaels and Celeste Monforton's paper⁶ carries

¹ See, e.g., Barry Meier, *Contracts Keep Drug Research Out of Reach*, N.Y. TIMES, Nov. 29, 2004, at A1.

² See, e.g., Barry Meier, *Medicine Fueled by Marketing Intensified Trouble for Pain Pills*, N.Y. TIMES, Dec. 19, 2004, at A1.

³ David Korn, *Maintaining the Integrity of Scientific Research*, 13 J.L. & POL'Y 7 (2005).

⁴ Sheldon Krimsky, *The Funding Effect in Science and its Implications for the Judiciary*, 13 J.L. & POL'Y 43 (2005).

⁵ *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993), requires federal judges to screen proffered expert testimony to determine whether it is relevant and reliable. See also *infra* note 11.

⁶ David Michaels & Celeste Monforton, *Scientific Evidence in the Regulatory System: Manufacturing Uncertainty and the Demise of the Formal*

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forward two themes discussed in the first two papers: the medical crises that may be precipitated by a lack of crucial information and the impact funding may have on the availability of data. Michaels and Monforton pose these questions with regard to the regulation of workplace hazards by administrative agencies. Starting with the case of Eric Peoples, a 32-year-old worker in a microwave popcorn factory who developed a rare and devastating lung disease after being exposed to a butter flavoring chemical, they examine the Occupational Safety and Health Administration's (OSHA) response and failure to take regulatory action. They conclude that workers may ultimately have to rely on the courts as the only path to compelling more protection in the workplace. According to the authors, "there is a growing trend in regulatory agencies that demands proof over precaution in the realm of public health and the environment."⁷

The remaining essays are devoted to a very different, but equally timely, subject: the admissibility of forensic evidence in criminal proceedings. Just weeks before the conference was held, one of the topics—fingerprinting—took center stage when the FBI announced that the fingerprints of Brandon Mayfield, a Portland, Oregon attorney, had been found on a bag of detonators discovered near the scene of the terrorist attack in Madrid, Spain that killed 191 people and injured several thousand more. Many developments in this case and the final denouement—the Spanish authorities' rejection of the fingerprint match, the identification of someone else as the source of the print, and the release of Mr. Mayfield from custody—took place after the live program at Brooklyn Law School. Fortunately for the reader, Professor Sandy Zabell, who made the presentation on fingerprints, has revised and updated his remarks to include a full discussion of the Mayfield case.⁸ His article presents a fascinating study of how mistakes in matching fingerprints can occur and explains why reliable fingerprint identifications hinge not only on the examiner's ability to make matches, but also on having data that validate the

Regulatory System, 13 J.L. & POL'Y 17 (2005).

⁷ *Id.* at 32.

⁸ Sandy L. Zabell, *Fingerprint Evidence*, 13 J.L. & POL'Y 143 (2005).

frequency with which particular friction ridge details occur. He then examines in detail the current research on fingerprints, which is deficient in these respects, and compares what is known about fingerprints with what is known about DNA.

The differences in fingerprint and DNA analysis are particularly compelling because of the papers that precede Professor Zabell's in this issue of the *Journal of Law and Policy*. Professor Julian Adams examines the methods used to match nuclear and mitochondrial DNA samples and then discusses how the frequency of DNA profiles is determined.⁹ He stresses "that the evidentiary value of DNA evidence is directly related to the frequency of a DNA profile."¹⁰ He explains how the estimated frequency of a nuclear DNA profile has decreased following the increase in the number of STR loci used by the FBI, and contrasts and accounts for the much higher frequencies associated with mitochondrial DNA. His discussion reinforces Professor Zabell's conclusions about the lack of validated knowledge regarding the frequency of fingerprint patterns.

Professor Edward Cheng's article on mitochondrial DNA further highlights the differences between nuclear and mitochondrial DNA.¹¹ It also contains a succinct and valuable discussion of problems posed by mtDNA evidence that courts may have to resolve in the future. For instance, although examinations of mtDNA clearly seem superior to microscopic hair analysis in more accurately attributing hairs found at a crime scene to their source, on what grounds, if any, should courts repudiate the microscopic technique on which they allowed experts to rely for more than a century? Is this a *Daubert* question, a matter of "best evidence," or a Rule 403 problem? Professor Cheng's discussion provides a useful framework for examining issues that arise as other new technologies emerge or old technologies are challenged.

One such challenge is the subject of Michael O. Finkelstein

⁹ Julian Adams, *Nuclear and Mitochondrial DNA in the Courtroom*, 13 J.L. & POL'Y 69 (2005).

¹⁰ *Id.* at 88.

¹¹ Edward K. Cheng, *Mitochondrial DNA: Emerging Legal Issues*, 13 J.L. & POL'Y 99 (2005).

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and Bruce Levin's article on bullet-lead analysis.¹² The FBI's crime laboratory had, for many years, been analyzing and comparing the composition of bullets recovered at a crime scene with that of bullets found in the possession of a suspect. If the concentrations of the elements in the samples compared closely enough, the FBI's examiner would declare that the bullets matched and then would further testify about the probative value of the match. In response to growing objections about this testimony by FBI experts, particularly with regard to probative value, the FBI commissioned a study by the National Research Council. A committee (on which Mr. Finkelstein served) was appointed to examine the technique of bullet-lead matching. It issued its findings in February 2004.

Part of the Finkelstein and Levin paper discusses the committee's findings and recommendations. The committee concluded that FBI experts at times testified in ways that could not be justified by the available science and data. The paper explains why this is so and gives examples of acceptable and unacceptable formulations by experts that should prove extremely helpful to judges and lawyers working on cases in which testimony about bullet-lead analysis is offered. Furthermore, the paper explains that the limitations suggested by the committee would apply to other kinds of expert identification testimony and, if adopted, "would change the way opinions in expert testimony are expressed in our courts."¹³

Although analyses of the first decade of experience with the Supreme Court's new test¹⁴ for the admissibility of expert testimony demonstrate that courts rarely applied *Daubert* criteria to

¹² Michael O. Finkelstein & Bruce Levin, *Compositional Analysis of Bullet as Forensic Evidence*, 13 J.L. & POL'Y 119 (2005).

¹³ *Id.* at 129.

¹⁴ See *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). For a discussion of *Daubert* and subsequent Supreme Court cases regulating the admissibility of expert proof, see Margaret A. Berger, *The Supreme Court's Trilogy on the Admissibility of Expert Testimony*, in REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 9 (Fed. Jud. Ctr. ed., 2d ed. 2000), available at [http://www.fjc.gov/public/pdf.nsf/lookup/sciman00.pdf/\\$file/sciman00.pdf](http://www.fjc.gov/public/pdf.nsf/lookup/sciman00.pdf/$file/sciman00.pdf) (last visited Jan. 25, 2005).

prosecution experts,¹⁵ that mindset may slowly be starting to change. Indeed, the FBI's request for a report on the validity of bullet-lead testing may be an indication that a sea change is in the offing. The second half of the Finkelstein and Levin paper is, therefore, extremely important because it examines in detail the scientific underpinnings for bullet lead analyses, relates them to *Daubert* factors, and suggests additional scientific studies for the FBI to undertake. This approach might serve as a template for scrutinizing other forensic identification techniques and may assist judges in handling the *Daubert* challenges to prosecution experts they may increasingly face in the future.

These very brief descriptions of the essays that follow certainly do not do justice to the authors' sophisticated explorations of their topics. It is hoped, however, that these remarks convey a glimpse of the variety, complexity, and currency of the scientific questions that judges may encounter in their courtrooms, and that the essays themselves will prove helpful in understanding and resolving the demanding science intertwined with policy issues that arise in twenty-first century America.

¹⁵ Joelle Anne Moreno, *What Happens When Dirty Harry Becomes an (Expert) Witness for the Prosecution?*, 79 TUL. L. REV. 1, 5 (2004) (stating "the *Daubert* revolution, aimed at upgrading the quality of expert evidence, has had surprisingly little impact in the criminal courts."). See also Symposium, *Expert Admissibility Symposium*, 34 SETON HALL L. REV. 1 (2003).