

FRIENDLY SCIENCE: MEDICAL, SCIENTIFIC, AND TECHNICAL AMICI BEFORE THE SUPREME COURT

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I. INTRODUCTION

From medical¹ to patent² to tort cases,³ the use of information from the natural sciences and from technical disciplines pervades many areas of adjudication.⁴ Scientific organizations encourage their members to participate in the adjudication process by providing scientific and technical information to courts through amicus curiae briefs,⁵ and by serving as

1. See, e.g., right-to-die cases such as *Washington v. Glucksberg*, 117 S. Ct. 2258 (1997); *Vacco v. Quill*, 117 S. Ct. 2293 (1997); *Cruzan v. Director, Missouri Dep't of Health*, 497 U.S. 261 (1990).

2. See, e.g., *Warner-Jenkinson Co. v. Hilton-Davis Chem. Co.*, 117 S. Ct. 1040 (1997) (seeking damages under the doctrine of equivalents for a patent infringement by a competitor's ultrafiltration method); *Lotus Dev't Corp. v. Borland Int'l, Inc.*, 516 U.S. 233 (1996) (regarding the patentability of a computer program's memo command hierarchy).

3. See, e.g., *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) (seeking recovery for birth defects allegedly produced by use of the drug Bendectin during a mother's pregnancy).

4. See generally Peter H. Schuck, *Multi-Culturalism Redux: Science, Law and Politics*, 11 YALE L. & POL'Y REV. 1, 3-4 n.9 (1993) (describing various areas of adjudication which involve science); JUDICIAL CONFERENCE OF THE UNITED STATES, FEDERAL COURTS STUDY COMMITTEE REPORT OF THE FEDERAL COURTS STUDY COMMITTEE 97 (Apr. 2, 1990) ("Economic, statistical, technological, and natural and social scientific data are becoming increasingly important in both routine and complex litigation.").

5. Literally, amicus curiae brief means a brief filed by a friend of the court. BLACK'S LAW DICTIONARY 107 (4th ed. 1968). A friend of the court is a by-stander

court-appointed experts. For instance, the American Association for the Advancement of Sciences founded the Court Appointed Scientific Experts Project in 1998 to “assist federal district judges to obtain independent scientific and technical experts.”⁶ Law professors have advocated this project as a way to “help[] courts get it right.”⁷

Justice Stephen Breyer addressed the increasing importance of scientific and technical information in U.S. Supreme Court cases at an annual meeting of the American Association for the Advancement of Science.⁸ He noted that amici participation in such cases play “important role[s] in educating the judges on potentially relevant technical matters,” thus helping to improve the quality of the Court’s decisions.⁹ As an example, he described how the discussion of pain control technology¹⁰ in

who interposes and volunteers information upon some matter of law in regard to which the judge is doubtful or mistaken; or upon some matter of which the court may take judicial cognizance. Implies friendly intervention . . . to remind court of legal which has escaped its notice, and regarding which it appears to be in danger of going wrong.

Id. (internal citations omitted).

6. AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, *CASE Mainpage*, at <http://www.aaas.org/spp/case/case.htm> (last visited Aug. 24, 2000). *See also* Mark S. Frankel, *The Role of Science in Making Good Decisions*, American Association for the Advancement of Science, at <http://www.aaas.org/spp/dspp/sfirl/projects/testim/mftest.htm> (June 10, 1998) (urging scientists and engineers to inform courts about the scientific issues involved in cases and arguing that the nature of the adversarial system often does not allow the parties “to enlighten either judges or juries about the validity of a scientific methodology or of the conclusions drawn from disparate data”).

7. Lee Siegel, *The Judicial System Needs Your Expertise, Law Professor Tells Physicists*, SALT LAKE TRIB., Mar. 23, 2000, at C2 (quoting Professor Susan Poulter’s address at the annual meeting of the American Physical Society). *See also* Robert J. Condlin, “What’s Really Going On?” *A Study of Lawyer and Scientist Inter-Disciplinary Discourse*, 25 RUTGERS COMPUTER & TECH. L.J. 181, 205-06 (1999) (arguing for scientists and lawyers to work together to bring scientific information to courts and legislators).

8. Stephen Breyer, *The Interdependence of Science and Law*, 82 JUDICATURE 24 (1998).

9. *Id.* at 26. *See also Science in Court*, WASH. POST, Feb. 19, 1998, at A16; Thomas G. Field, Jr., Letters, *Scientific Evidence and the Courts*, 262 SCIENCE 1629, 1629-30 (1993) (urging the scientific community to invest more resources in to developing useful materials for courts). *Cf.* Ellie Margolis, *Beyond Brandeis: Exploring the Uses of Non-Legal Materials in Appellate Briefs*, 34 U.S.F. L. REV. 197 (2000) (exploring the use of “legislative facts” such as scientific and empirical studies in appellate litigation); Rachael N. Pine, *Speculation and Reality: The Role of Facts in Judicial Protection of Fundamental Rights*, 136 U. PA. L. REV. 655 (1988) (arguing that the Court has increasingly relied on legislative facts, including scientific facts, after the beginning of the twentieth century).

10. The availability of methods to control pain was of crucial concern to the Court in *Washington v. Glucksberg*, where the Court addressed the constitutionality of a state statute banning assisted suicide. 521 U.S. 702 (1997). Because the Court noted that “many people who request physician-assisted suicide withdraw that request if their depression and pain are treated,” the Court was understandably concerned with the availability of methods to lessen the pain felt by and manage the symptoms of patients with severe illnesses. *See id.* at 730. Amici opposed to the statute discussed the chronic and acute pain felt by many terminally ill patients, while amici writing in support of the statute, such as the American Medical Association, noted the availability of pharmacological methods other than heavy sedation or anesthesia to lessen the pain of those patients. *See, e.g., Brief for Julian*

various amicus briefs helped the Justices to “identify areas of technical consensus and disagreement.”¹¹

This paper examines the participation of medical, scientific, and technical organizations, as well as individuals in a medical, scientific, or technical capacity, as amici before the Supreme Court. This examination is limited to organizations’ and individuals’ participation as parties on amicus curiae briefs.¹² Part II discusses the general role of amici before the Supreme Court, as well as scientific and technical information currently presented to the Court. This Part then briefly introduces and critiques the Court’s use of scientific and technical information as “legislative facts”—legally significant facts that transcend a particular dispute yet are still relevant to the legal reasoning involved in the dispute—providing examples of cases where the Court has used “legislative facts” both inside and outside the context of science.¹³ This Part argues that there are two reasons why the scientific and technical amici participation is important when the Supreme Court adjudicates in technical and scientific areas. First, the information and expertise—especially regarding the scientific process as well as particular scientific facts—provided by scientific and technical amici are necessary for the Court to appreciate fully the consequences at stake in a particular case. Second, the information and their expertise are necessary for the public to contextualize the Court’s rulings.

Part III describes what parties are considered scientific or technical amici within the scope of this paper, and lays out the methodology used to conduct research on those parties’ amicus briefs. Part IV explores actual amicus curiae briefs of medical, scientific, and technical amici. This Part addresses the characteristic factors examined for each amici participant and each amicus brief and also presents the results of this study of ninety-two medical, scientific, and technical organizations and individuals that have been amici before the Supreme Court in the last decade. Particularly, this study exposes the relative predominance of medical organizations as

M. Whitaker, *Washington v. Glucksberg*, 521 U.S. 702 (No. 98-110), and *Vacco v. Quill*, 521 U.S. 793 (No. 95-1858); Brief for the American Medical Association et al., *Washington v. Glucksberg*, 521 U.S. 702 (No. 95-1858).

11. Breyer, *supra* note 8, at 26.

12. This paper, however, does recognize that amici often participate in other ways, such as commenting on briefs and mooted parties.

13. See Kenneth Culp Davis, *An Approach to Problems of Evidence in the Administrative Process*, 55 HARV. L. REV. 364, 402-03 (1942) (characterizing two types of evidentiary facts—legislative and adjudicative—and distinguishing legislative facts from adjudicative facts as facts within the province of the trier of fact to decide).

amici and the relative absence of medical, scientific and technical amici in environmental cases.

Part V of this paper then considers possible explanations for the disparity between medical, scientific, and technical amici participation. These explanations include the nature of the Supreme Court docket and varying levels of attorney familiarity with scientific and technical amici. The relative absence of scientific and technical amici in environmental cases is especially notable because environmental cases have similar characteristics to health and medical cases in which the Court found scientific and technical, as well as medical amici participation useful. Consequently, this paper addresses the value that scientific and technical organizations add as amici in environmental cases. In particular, it examines the role that they did play in informing the Court about scientific issues in *American Trucking Associations, Inc. v. EPA*,¹⁴ as well as additional roles that they could have played. In *American Trucking*, amici briefs by scientific organizations will aid the Court by presenting critical information about the nature of risk assessment, although more participation would have been helpful for the Court's full resolution of the scientific issues involved.¹⁵

Part VI concludes that scientific and technical amici can participate in ways valuable to the Court when the dispute allows these amici to present information relevant to their technical or scientific expertise. Because environmental cases frequently involve scientific and technical matters,¹⁶ this paper urges scientific and technical organizations to increase their participation as amici in these cases to enable the Court to maintain a consistent level of informed decision making in all environmental cases involving scientific and technical issues.

14. 175 F.3d 1027 (D.C. Cir. 1999), *rev. denied in part, granted in part*, 195 F.3d 4 (D.C. Cir. 1999), *petition for cert. granted*, 68 U.S.L.W. 3496 (U.S. May 22, 2000) (No. 99-1257), *cross-petition granted*, 68 U.S.L.W. 3566 (U.S. May 30, 2000) (No. 99-1426) (regarding the constitutionality of EPA setting standards for nonthreshold pollutants).

15. The Federal Judicial Center defines risk assessment as the "approach increasingly used by regulatory agencies to estimate and compare the risks of hazardous chemicals and to assign priority for avoiding their adverse effects." See FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 412 (2d ed. 2000).

16. See Wendy E. Wagner, *Congress, Science, and Environmental Policy*, 1999 U. ILL. L. REV. 181, 187 n.24 (1999) (noting that "many environmental programs owe their birth, if not their entire existence, to scientific consensus—developed through numerous, diverse studies—regarding a causal relationship between types of human activity and resulting environmental degradations").

II. BACKGROUND

A. *Amicus Participation*

In the U.S. Supreme Court, the percentage of cases with amici participation rose from thirty-five percent in the 1965-1966 term¹⁷ to eighty-two percent in the 1987-1988 term,¹⁸ and to over ninety percent in the 1995-1996 term.¹⁹ Participants included special interest organizations, parties in similar cases, government agencies, affected individuals, law professors in specialized fields, and various levels of bar associations.²⁰ Bruce Ennis, an experienced U.S. Supreme Court advocate, has described three major categories of effective amici participation and amicus curiae briefs.²¹ First, effective amici briefs may help flesh out legal arguments that the parties are forced to make in abbreviated form.²² Second, they may present arguments that the parties feel reluctant to make for strategic reasons.²³ Third, they may inform the Court of broader legal and policy implications of a ruling.²⁴ Both Ennis and other commentators have noted that amicus curiae briefs are more persuasive when they present facts and arguments that the Court would not have received from the parties themselves.²⁵ Otherwise, the briefs serve only as “me-too” documents.²⁶ Indeed, a recent comprehensive study of Supreme Court amicus briefs

17. See Bruce J. Ennis, *Effective Amicus Briefs*, 33 CATH. U. L. REV. 603 (1984).

18. See ROBERT L. STERN ET AL., *SUPREME COURT PRACTICE* 564 (7th ed. 1993).

19. See Susan J. Becker, *Amicus Filings on the Rise*, 23 LITIG. NEWS, July 1998, at 3.

20. See Reagan Wm. Simpson, *How to Be a Good Friend to the Court: Strategic Use of Amicus Briefs*, 28 BRIEF 38, 39 (1999).

21. See Ennis, *supra* note 17, at 606-08.

22. See *id.*

23. See *id.*

24. See *id.*

25. See Mary-Christine Sungaila, *Effective Amicus Practice Before the United States Supreme Court: A Case Study*, 8 S. CAL. REV. L. & WOMEN'S STUD. 187, 189 (1999) (noting that an amicus should “supplement, rather than duplicate, the party’s brief”); Ennis, *supra* note 17, at 608 (“It is an improper use of the amicus role, and an imposition on the Court, to file a ‘me too’ amicus brief.”).

26. Supreme Court Rule 37.1 states:

An *amicus curiae* brief that brings to the attention of the Court relevant matter *not already brought to its attention by the parties* may be of considerable help to the Court. An *amicus curiae* brief that does not serve this purpose *burdens the Court*, and its filing is not favored.

S. Ct. R. 37.1 (emphasis added). See also Ennis, *supra* note 17, at 608 (arguing that filing a “me too” brief constitutes an imposition on the Court); Simpson, *supra* note 20, at 43 (arguing that amicus briefs should “never simply repeat arguments made by the parties”); Sungaila, *supra* note 25, at 189 (arguing that amici should resist the temptation to say little more than “me too”); Alexander Wohl, *Friends with Agendas*, 82 A.B.A. J., Nov. 1996, at 46, 48 (quoting William L. Robinson, chair of the ABA Standing Committee on Amicus Curiae Briefs, who states that “[a] large number of amicus briefs just don’t have anything special to say beyond what the parties are saying,” to argue that most amicus briefs are ineffective).

found that amicus briefs have a statistically significant effect on the Court's decision making, especially when they present "new information—legal arguments and background factual material—that would be relevant to persons seeking the correct result in light of established legal norms."²⁷

Scientific and technical amici may be the best parties to present the third category of effective briefs outlined by Ennis. The unique perspectives, facts, and arguments of scientific disciplines can inform the Court of the broader legal and policy implications of its rulings. For instance in *Daubert v. Merrell Dow Pharmaceuticals*, the Court held that federal trial judges must be gatekeepers for the admission of scientific evidence, citing to three amicus briefs filed on behalf of groups of scientists.²⁸ In *Daubert*, the Court found it necessary to decide how to determine what constitutes "scientific knowledge under Federal Rules of Evidence 702."²⁹ Rule 702 provided for admission of expert testimony "[i]f scientific, technical, or other specialized knowledge will assist the trier of fact. . . ."³⁰ The central question was whether a "general acceptance" rule would determine the admission of scientific evidence or if the trial judge would play a broader gatekeeping role when admission of expert testimony is sought under Rule 702.³¹

Groups of individual scientists filed two amicus briefs,³² and the American Association for the Advancement of Science filed a third amicus brief cited by the Supreme Court in *Daubert*.³³ Of the twenty-two amicus briefs filed in the case, most of them provided information on matters such

27. Joseph D. Kearney & Thomas W. Merrill, *The Influence of Amicus Curiae Briefs on the Supreme Court*, 148 U. PA. L. REV. 743, 748 (2000). In particular, Kearney and Merrill's study examined all Supreme Court decisions from the 1946-1947 term to the 1995-1996 term and classified the outcomes and amicus participation in 6141 cases. The study categorized the number of amicus briefs supporting the petitioner, respondent, or neither party. Notably, the study found that the amicus briefs supporting respondents were more successful than the amicus briefs supporting the petitioner. *See id.* at 816-17. The study also reported that cited briefs did not have a greater success rate than noncited amicus briefs. *See id.* at 811-12. Finally, the study found that "repeat players" who consistently filed high-quality amicus briefs, such as the ACLU and the AFL-CIO, were more successful than the average amicus brief filer. *See id.* at 813-15, 819.

28. *See* 509 U.S. 579 (1993).

29. *Id.* at 589-90.

30. *See id.* (citing FED. R. EVID. 702).

31. *See id.* at 588. *See also id.* at 579 (describing the "general acceptance" rule as a rule that would exclude expert opinion based on a scientific technique if that technique were not "generally accepted" as reliable within the relevant scientific community).

32. *See id.* at 590 (citing Brief for Nicolaas Bloembergen et al., as amicus curiae); *id.* at 596 (citing Brief for Ronald Bayer et al., as amicus curiae).

33. *See id.* at 590 (citing Brief for American Association for the Advancement of Science et al., as amicus curiae).

as definitions of scientific knowledge, scientific validity, and peer review.³⁴ These briefs certainly seemed important to the Justices formulating the majority opinion.³⁵ Even though Justice Rehnquist, in his dissent, acknowledged the information in the amicus briefs as “far afield from the expertise of judges,”³⁶ he nevertheless wrote, “[t]his is not to say that such materials[, the amicus briefs,] are not useful or even necessary in deciding how Rule 702 should be applied”³⁷

Notably, many of the amicus briefs in *Daubert* discuss meta-science—the scientific method and process of scientific research—rather than particular scientific determinations. This is also true in *Kumho Tire Co. v. Carmichael*³⁸ and *General Electric Co. v. Joiner*,³⁹ two subsequent cases involving the admissibility of expert testimony in which the Court cited extensively to briefs by scientific amici. In *Daubert*, descriptions of the nature of science as “not an encyclopedic body of knowledge . . . [but rather] a process for proposing and refining theoretical explanations about the world that are subject to further testing and refinement”⁴⁰ allowed the majority to reject the use of a “general acceptance” test for the admission of scientific evidence and instead assign the gatekeeping role to the trial judge for assessing the admission of scientific expert testimony. Indeed, scientific and technical amici may be most helpful to the Court in disputes that implicate the procedural aspects of science rather than substantive scientific determinations because such meta-scientific information is less akin to “facts” ordinarily left to the determination of the trial court and more related to the establishment of legal rules.⁴¹

Finally, scientific and technical organizations possess the credibility to present such information, both about the methodology of science and about substantive scientific determinations. Among the general public, both physicians and scientists rate among the highest of all professional groups with respect to public esteem.⁴² In addition, both the Court⁴³ and

34. *See id.* at 588.

35. *Id.* at 590, 596-97.

36. *Daubert*, 509 U.S. at 598-99 (Rehnquist, J., concurring in part, dissenting in part).

37. *Id.* at 599.

38. 526 U.S. 137 (1999).

39. 522 U.S. 136 (1997).

40. Brief for the American Association for the Advancement of Science and the National Academy of Sciences, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 590 (1993) (No. 92-102).

41. *Cf. Daubert*, 509 U.S. 579, 592-94 (creating guidelines to determine whether expert evidence constitutes “scientific knowledge” (for example, whether it has been tested in the scientific community, whether it has been subjected to peer review, its known or potential rate of error, and its “general acceptance”), and to support the use of these guidelines as factors instead of gatekeeping tests, the Court cited to authorities presented by the amici themselves).

42. *See* Andrew Lawler, *Support for Science Stays Strong*, 272 SCIENCE 1256, 1256 (1996)

the public perceive science, as well as scientific groups, as “neutral,”⁴⁴ regardless of whether or not this is actually the case.⁴⁵ Therefore, the Court may be more receptive to scientific information presented by scientific amici in their briefs.

B. Venturing Afield: The Use of and Call for More Empirical Scientific Material in Judicial Decision Making

By the time a legal dispute reaches appellate review, triers below have already made factual determinations regarding the dispute. Therefore, when scientific and technical amici brief the Court on information regarding science or the nature of science, they present different types of facts, categorized by Professor Kenneth Culp Davis as legislative facts.⁴⁶ Professor Davis defines legislative facts as significant facts relevant to the legal reasoning in the resolution of an adjudicated dispute but which transcend the particular dispute itself.⁴⁷ In this way, adjudicated facts that

(noting that “leaders in the scientific community rank second only to physicians in public esteem”).

43. See, e.g., *Bragdon v. Abbott*, 524 U.S. 624, 626-27 (1998) (accepting risk assessment based on “medical or other *objective*, scientific evidence”) (emphasis added).

44. See *Barefoot v. Estelle*, 463 U.S. 880, 928 n.8 (1983) (Blackmun, J., dissenting) (citing Edward J. Imwinkelried, *Evidence Law and Tactics for the Proponents of Scientific Evidence*, in *SCIENTIFIC AND EXPERT EVIDENCE* 33, 37 (Edward J. Imwinkelried ed., 1981) (“[Lay jurors] tend to assume [scientific evidence] is more accurate and objective than lay testimony.”)). See also BERTRAND RUSSELL, *A HISTORY OF WESTERN PHILOSOPHY* 494 (1945) (“Unlike religion, [science] is ethically neutral: it assures men that they can perform wonders, but does not tell them what wonders to perform.”); Samuel J. McNaughton, *What Is Good Science?*, 13 *NAT. RESOURCES & ENV'T* 513, 514 (1999) (arguing that objectivity in execution is a standard of good science, but recognizing that all science is not “good”); cf. DAVID COLLINGRIDGE & COLIN REEVE, *SCIENCE SPEAKS TO POWER: THE ROLE OF EXPERTS IN POLICY MAKING* 34 (1986) (arguing that occasionally “science is used to legitimate or rationalize political choices which have already been taken”); Rochelle Cooper Dreyfuss & Dorothy Nelkin, *The Jurisprudence of Genetics*, 45 *VAND. L. REV.* 313, 338, 345 (1992) (“[I]n its promises of neutrality, predictability, and certainty, science holds extraordinary appeal for the legal system.”); Dorothy Nelkin, *After Daubert: The Relevance and Reliability of Genetic Information*, 15 *CARDOZO L. REV.* 2119, 2125-26 (1994) (“[I]t is . . . comforting [to the public] to believe that there is definitive, science-based information relevant to understanding and resolving social problems.”).

45. See Thomas M. Crowley, *Help Me Mr. Wizard! Can We Really Have “Neutral” Rule 706 Experts?*, 1998 *DET. C.L. MICH. ST. U.L. REV.* 927 (questioning the neutrality of scientific experts); Howard A. Denmark, *The Search for “Scientific Knowledge” in Federal Courts in the Post-Frye Era: Refuting the Assertion that “Law Seeks Justice While Science Seeks Truth,”* 8 *HIGH TECH L.J.* 235 (1993) (discussing whether the goals of law and science are distinct); Michael S. Jacobs, *Testing the Assumptions Underlying the Debate About Scientific Evidence: A Closer Look at Juror “Incompetence” and Scientific “Objectivity,”* 25 *CONN. L. REV.* 1083 (1993) (arguing that scientific objectivity cannot be assumed); Carl B. Meyer, *Science and Law: The Quest for the Neutral Expert Witness. A View from the Trenches*, 12 *J. NAT. RESOURCES & ENVTL. L.* 35 (1996-1997) (examining bias in scientific experts); Ned Miltenberg, *Myths about “Neutral” Scientific Experts*, 36 *TRIAL*, Jan. 2000, at 62 (critiquing assumptions about scientific experts).

46. See Davis, *supra* note 13, at 402-03.

47. *Id.* at 402. In the context of constitutional interpretation, Professor David Faigman refined the

are within the province of the trial court are distinguished from legislative facts which can be considered and used by courts of review. Some scholars argue that the Court rarely relies on such information for decision making purposes, but limits it to rhetorical use.⁴⁸ Others accept that the Court does rely on such information for decision making purposes but argue against the normative linking of adjudicative rights to potential fluxes in scientific evidence.⁴⁹

Scientific information can underly legislative factfinding. For instance, Justice Breyer noted that the extent to which medical technology reduces the risk of dying in severe pain underlies the answer to whether the right to assisted suicide is a constitutional liberty.⁵⁰ Similarly, medical information concerning the nature of mental illness underlies the determination of whether public safety can justify indefinite noncriminal confinement.⁵¹ Further Justice Breyer's recent opinion in *Stenberg v. Carhart* illustrates the value of this input from medical, scientific, and technical amici to the Court.⁵² *Stenberg* involved a challenge to Nevada's ban on "partial birth" abortions as lacking any exception to preserve the health of the mother and as unconstitutionally burdening the woman's ability to choose a certain type of abortions procedure.⁵³ Justice Breyer treated the presence of medical amici in support of both the petitioner and the respondent⁵⁴ as

category of legislative facts into two subcategories: (1) "constitutional-rule" facts which support a particular interpretation of the Constitution and (2) "constitutional-review" facts which are used under the pertinent constitutional rule to determine the constitutionality of a particular action. See Faigman, *infra* note 48, at 553. These categories can be generalized to any form of legislative review by redesignating them legislative-rule facts and legislative-review facts.

48. See, e.g., Dean M. Hashimoto, *Science as Mythology in Constitutional Law*, 76 OR. L. REV. 111 (1997) (arguing that in American culture, where legitimacy is accorded to scientific findings, the Court recites scientific facts only to demonstrate that its rulings are in accord with such findings). Cf. David L. Faigman, "Normative Constitutional Fact-Finding: Exploring the Empirical Component of Constitutional Interpretation," 139 U. PA. L. REV. 541, 549 (1991) (citing critiques of the Supreme Court's use of "empirical research when it fits the Court's particular needs"). Professor Faigman makes an alternative critique to the Court's use of scientific information. In addition to charging that science is used rhetorically, he argues that the Court treats scientific information as a "matter of normative legal judgment rather than a separate inquiry aimed at information gathering." *Id.*

49. Justice O'Connor's dissenting opinion in *Akron v. Akron Center for Reproductive Health, Inc.*, is a prime example of this critique. 462 U.S. 416, 458 (1983) (O'Connor, J., dissenting) (arguing that links to medical technology has set the Court "on a collision course with itself").

50. See Breyer, *supra* note 8, at 24-25.

51. *Id.* at 25.

52. 120 S. Ct. 2597, 2617 (2000) (upholding a challenge to the constitutionality of the Nebraska statute banning "partial birth" abortion).

53. See *id.*

54. See, e.g., Brief for American College of Obstetricians and Gynecologists et al., *Stenberg v. Carhart*, 120 S. Ct. 2597 (2000) (No. 99-830) (supporting respondents challenging the statute); Brief for the American Civil Liberties Union and Various Medical Doctors, *Stenberg* (No. 99-830) (supporting respondents challenging the statute); Brief for Association of American Physicians and

having informative value. After discussing the medical information presented by these amici, he noted:

[T]he division of medical opinion about [the dilation and extraction method] at most means uncertainty, a factor that signals the presence of risk, not its absence. That division here involves highly qualified knowledgeable experts on both sides of the issue. Where a significant body of medical opinion believes a procedure may bring with it greater safety for some patients and explains the medical reasons supporting that view, we cannot say that the presence of a different view by itself proves the contrary. Rather, the uncertainty means a significant likelihood that those who believe that [the dilation and extraction method] is a safer abortion method in certain circumstances may turn out to be right. If so, then the absence of a health exception will place women at an unnecessary risk of tragic health consequences. If they are wrong, the exception will simply turn out to have been unnecessary.⁵⁵

Not all Justices rely on scientific information as legislative facts, however, nor are all as receptive to the use of empirical research as Justice Breyer. For instance, Justice Sandra Day O'Connor's dissent in *Akron v. Akron Center for Reproductive Health* expressed explicit disapproval of the linkage between the constitutional framework for abortion regulation in *Roe v. Wade* and the state of medical technology.⁵⁶ Also, Justice Rehnquist has dismissed the presentation of social science studies demonstrating a jury's bias towards sentencing a defendant to death as only marginally relevant to the constitutionality of a defendant's conviction.⁵⁷

The reluctance of some Justices and judges to incorporate scientific information in the development of their legal opinions may derive from their unfamiliarity with these disciplines. For example, in advocating for specialized courts to hear patent cases, Judge Henry Friendly argued that the patent cases dealing with the higher reaches of science are often "quite beyond the ability of the usual judge to understand without the expenditure of an inordinate amount of educational effort by counsel and of attempted

Surgeons et al., *Stenberg* (No. 99-830) (supporting petitioners seeking to uphold the statute). *See also* Carhart v. Stenberg, 972 F. Supp. 507, 511 (D. Neb. 1997) (noting that both parties have stipulated to a part of AMERICAN MEDICAL ASSOCIATION, REPORT OF THE BOARD OF TRUSTEES ON LATE-TERM ABORTION (1997)).

55. *Stenberg*, 120 S. Ct. at 2612-13.

56. *Akron*, 462 U.S. at 458.

57. *See* Lockhart v. McCree, 476 U.S. 162, 168-71 (1986).

self-education by the judge, and in many instances, even with it.”⁵⁸ Nevertheless, Justice Harry Blackmun, and now Justice Breyer, have urged researchers to present additional empirical findings to the Court.⁵⁹ Justice Brennan has emphasized the compelling effect that empirical findings can have as well. For instance, in *United States v. Leon*, Justice Brennan noted in his dissent that the Court might not have created a good-faith exception to the Fourth Amendment’s rule to exclude evidence obtained from unlawful searches or seizures had empirical research refuted the Court’s assumption that a good-faith exception would not affect deterring constitutional violations by the police.⁶⁰ By noting that the constitutionality of the good-faith exception could again be challenged in light of additional empirical research, Brennan implicitly urged social scientists to research the relationship between good-faith exceptions and the deterrence of unconstitutional police searches and seizures.

Although the Court’s reception of empirical research is mixed,⁶¹ the fact that some Justices consider such research useful, and even persuasive, should motivate scientific and technical researchers to present such information to the Court. Only by doing so can researchers shape the Justices’ perceptions of the scientific context of their decisions. Moreover,

58. HENRY J. FRIENDLY, *FEDERAL JURISDICTION: A GENERAL VIEW* 157 (1973). *See also* Richard L. Revesz, *Specialized Courts and the Administrative Lawmaking System*, 138 U.P.A. L. REV. 1111 (1990) (discussing asserted reasons for the establishment of specialized courts, such as patent claims courts, but arguing that the creation of specialized courts not subject to generalist review should be avoided because the isolation of particular types of cases within specialized court systems interferes with the coherence of federal law as a whole).

59. *See supra* notes 50-55 and accompanying text; *see generally* Steven R. Schlesinger & Janet Nesse, *Justice Harry Blackmun and Empirical Jurisprudence*, 29 AM. U.L. REV. 405, 406 (1980) (describing Blackmun’s use of scientific data in his formulation of legal opinions). Blackmun’s use of and receptivity to scientific information probably derived from his background in medical-legal matters. *See* Ann Alpers, *Justice Blackmun and the Good Physician: Patients, Populations, and the Paradox of Medicine*, 26 HASTINGS CONST. L.Q. 41, 53-54 (1998) (attributing Justice Blackmun’s “lead[ing] of American medical philosophy” in part to the “happy decade he spent as general counsel to the Mayo Clinics and Association” as well as to his long-time fascination with Hippocrates); Gregg Orwoll, *Harry Andrew Blackmun*, 43 AM. U. L. REV. 731, 732 (1994) (discussing Blackmun’s practice at the Mayo Clinic as Resident Counsel).

60. 468 U.S. 897, 929 (1984).

61. Professor Faigman categorizes the Supreme Court’s use of empirical evidence into four categories: (1) application—when the Court correctly applies available empirical evidence towards the development of its conclusions; (2) misapplication—when the Court uses empirical research, but misapplies it to its determinations; (3) nonincorporation—when the Court acknowledges the validity, relevancy, and importance of available empirical evidence but fails to find it conclusive enough to alter its holdings; and (4) dismissal—when the Court dismisses empirical evidence entirely, either as invalid, irrelevant, or unimportant. *See* Faigman, *supra* note 48, at 550. *See also* Hashimoto, *supra* note 48 (arguing that even the Court’s apparent acceptance of scientific findings may not constitute actual acceptance, as the Court recites scientific facts merely to demonstrate that its rulings are in accord with such findings).

when the briefs of the parties and the amici do not present empirical evidence relevant to the Court's formulation of new legal rules, the Court may seek out such information themselves.⁶² Researchers have studied this phenomenon with respect to federal and state appellate courts. One researcher documented anecdotal evidence that appellate courts often took judicial notice of legislative facts not provided by the parties.⁶³ Another researcher noted that one-quarter of the legislative facts cited in appellate court opinions was provided by party counsel.⁶⁴ Professor Margolis found that "[w]hile there are many legitimate questions about courts' use of non-legal materials, they do not negate the fact that courts are using, and will continue to use nonlegal information in support of decisions."⁶⁵ Given these circumstances, Margolis argued that parties would be remiss in failing to present legislative facts to the Court.⁶⁶ These arguments apply more strongly to scientific and technical organizations in cases involving scientific and technical issues, because of both their familiarity with pertinent legislative facts in such cases, and their ability to achieve credibility as more neutral "friends of the court."

Even when Justices do not incorporate scientific facts accurately, or when Justices do not directly rely on empirical evidence, the presentation of such evidence may be necessary for the public to contextualize the Court's decisions. In turn, increased public awareness provides independent restraints on judicial decision making by "establishing the grounds for debate and the boundaries beyond which the Court may not venture."⁶⁷ The Court can undermine its own legitimacy when it makes decisions that deviate too strongly from the public's understanding of the issues because the public's faith in the justice of the Court's decisions is tied to its understanding of the issues.⁶⁸ In a time full of increasing

62. See George R. Currie, *Appellate Courts Use of Facts Outside of the Record by Resort to Judicial Notice and Independent Investigation*, 1960 WIS. L. REV. 39; Kenneth L. Karst, *Legislative Facts in Constitutional Litigation*, 1960 SUP. CT. REV. 75, 84; Margolis, *supra* note 9, at 202. Cf. Wendy E. Wagner, *Ethyl: Bridging the Law-Science Divide*, 74 TEX. L. REV. 1291 (1996) (approving of Judge Wright's en banc opinion in *Ethyl Corp. v. EPA*, 541 F.2d 1 (D.C. Cir. 1976), because of its rigorously analytical approach to "a complex socio-scientific challenge to the EPA's lead standard for gasoline").

63. See Currie, *supra* note 62, at 44-49; see also John Monahan & Laurens Walker, *Judicial Use of Social Science Research*, 15 LAW & HUM. BEHAV. 571 (1991).

64. See THOMAS B. MARVELL, *APPELLATE COURTS AND LAWYERS* 174 (1978).

65. Margolis, *supra* note 9, at 208.

66. *Id.*

67. DAVID L. FAIGMAN, *LEGAL ALCHEMY: THE USE AND MISUSE OF SCIENCE AND LAW* 114 (1999).

68. See Condlin, *supra* note 7, at 205 ("[The] failure to incorporate science, accurately understood, into legal resolutions . . . undercuts the legitimacy of those resolutions."); John M. Scheb

national acceptance of scientific and technical authority,⁶⁹ the public's awareness of scientific and technical research accordingly affects the judicial process. By explicitly rejecting or expressing disdain for empirical research, the Court may impair public trust in its decisions. For instance, the Court received widespread criticism for explicitly rejecting a comprehensive study indicating that defendants charged with killing white individuals were four times more likely to receive the death penalty than defendants charged with killing African Americans.⁷⁰ Although the study did not appear to impact the Court's holding, its presentation apprised the public of the Court's willingness to uphold a death sentence despite indications of widespread systematic prejudice. Such notice provided the public with a more comprehensive and critical understanding of the nature of the Court's decision. Generally, the Court's rejection of such scientific studies also invites the public to openly challenge its decisions, legislators to revise challenged statutes to incorporate scientific understanding, and researchers to provide more studies to demonstrate the veracity of their positions.

III. SCOPE OF EXAMINATION

Scientific and technical organizations often participate as amici for the same reasons that many other amici participate: to ensure the legitimacy of the Court's decision making, to ensure its accountability, to appeal to judicial reliance, to establish their own presence as legitimate political actors, and to promote their own professional interests. However, these organizations do not participate as amici in every case that implicates scientific or medical concerns. This Part examines the actual participation of such organizations and individuals before the Court during the past decade.⁷¹

II & William Lyons, *Public Perception of the Supreme Court in the 1990s*, 82 JUDICATURE 66 (1998) ("Although the Supreme Court is ostensibly immune to the ebbs and flows of public opinion, most observers agree that it must enjoy a reasonable measure of public support or risk losing the legitimacy that undergirds its decisions."); James G. Wilson, *The Role of Public Opinion in Constitutional Interpretation*, 1993 BYU L. REV. 1037, 1040 (arguing that reliance by some Justices on public opinion has a viable historical basis, and that "public opinion *ought* to influence many constitutional decisions") (emphasis added).

69. See *Science and Truth*, OFFSHORE, May 1998, at 8 ("The scientific research community consistently earns the highest public approval ratings of all groups in the US and Europe.").

70. See *McCleskey v. Kemp*, 481 U.S. 279 (1987); FAIGMAN, *supra* note 67, at 118 (noting that *McCleskey* met a barrage of criticism from academics, public interest groups, and the media, as well as a "flurry of proposals to reverse its effects through legislation introduced in chambers from Athens to Washington, D.C.").

71. An assessment of the actual influential effect of scientific and technical amici is outside the

The scope of this examination includes all groups of individual scientists, doctors, and engineers as well as medical, scientific, and technical organizations who have submitted amicus curiae briefs to the Supreme Court. This Part's examination of individuals and organizations from scientific disciplines is limited to those from the natural sciences and thus, does not include those from the social sciences. Medical and technical disciplines are included in this study because of their foundations in the natural sciences. Groups of "individual scientists, doctors, and engineers" includes all individuals with advanced degrees in either engineering, science, or medicine. Each group of named individuals was tallied as a single party for the purposes of counting. In addition, this examination limits its definition of "scientific or technical organizations" to organizations that both focus on a particular area in medicine, science, or engineering and claim to represent mainly individuals that fall under this paper's definition of "doctors, scientists, and engineers."⁷²

scope of this paper. For a recent comprehensive study on the topic, see Kearney & Merrill, *supra* note 27.

72. This seemingly simple delineation of an organization as a "medical, scientific, or technical organization" is not without controversy. For instance, the American Association for the Advancement of Science (AAAS), recognized as the nation's largest scientific organization, acts as an umbrella organization for "more than 143,000 scientists, engineers, science educators, policymakers, and others dedicated to scientific and technological progress in service to society" and 285 "affiliated organizations." AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, *General Information*, at <http://www.aaas.org/aaas/geninfo.html> (last visited Aug. 24, 2000). These organizations, however, range from independent societies of scientists such as the Society for Integrative and Comparative Biology to more industry-based groups, such as the Poultry Science Association. See Miltenberg, *supra* note 45, at 65-66 (arguing that even "neutral" scientific organizations such as the American Association for the Advancement of Science include members with strong commercial interests); AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, *Affiliates*, at <http://www.aaas.org/aaas/affil.html> (last visited Aug. 24, 2000) (providing links for all of AAAS's affiliated organizations). Within the scope of this paper, however, the Society for Sedimentary Geology is considered a "medical, scientific, or technical organization" because it consists of members trained in a natural science and sedimentary geology, and is dedicated to advancing and disseminating information about a specific subject area—sedimentology, paleontology, and other related specialties. See Society for Sedimentary Geology, *SEPM (Society for Sedimentary Geology)*, at <http://www.sepm.org/sepm.html> (last visited Aug. 24, 2000) (Bylaws state that "SEPM, through its network of international members, is dedicated to the dissemination of scientific information on sedimentology, stratigraphy, paleontology, environmental sciences, marine geology, hydrogeology, and many additional related specialties."). However, the Poultry Science Association is not considered a "medical, scientific, or technical organization" because the Poultry Science Association's members consist of "administrators and producers" as well as scientists and its mission statement focuses on advancing a particular industry, rather than on advancing a particular area of science. See POULTRY SCIENCE ASSOCIATION, *Mission & Objectives*, at <http://www.psa.uiuc.edu/mission.html> (last visited Aug. 24, 2000) ("The Poultry Science Association . . . is a professional organization consisting of approximately 3500 educators, scientists, extension specialists, administrators and producers who are committed to advancing the poultry industry."). Similarly, the History of Science Society is not considered a "medical, scientific, or technical organization" because the history of science does not qualify as an area of science, engineering, or medicine, nor do the members generally have graduate

It is a difficult task to distinguish the particular disciplines that fall under this paper's scope of "medicine, science, or engineering." The line between natural sciences and social sciences is not always clear, and even the determination of what constitutes science is a point of contention.⁷³ Thus, this paper does not attempt to create a normative distinction between the natural sciences, the social sciences, engineering, and medicine. Indeed, under *Kumho Tire Co. v. Carmichael*, such a distinction is not even legally relevant with respect to evidence.⁷⁴ Rather, what constitutes "medicine, science, or engineering" within the scope of this paper is prescribed in a categorical, rather than a rule-based, manner. This Article therefore examines groups whose focal disciplines fall within these particular subdisciplines: mathematics, physics, chemistry, biology, medicine (including psychiatry), and engineering. The study includes medical groups who primarily emphasize the treatment of patients through a particular subdiscipline and scientific or technical groups who primarily emphasize research in a particular subdiscipline of the natural sciences or technology.

For the purposes of this examination, I collected medical, scientific, and technical amici briefs filed during the past ten terms of the Court, from the 1990-1991 term to February 2000 of the 1999-2000 term. In all, I found forty-four cases in which at least one organization or individual falling under this Article's definition of "medical, scientific, or technical amici" participated. I then tabulated, created identifying key phrases,⁷⁵ and briefed descriptions of the legal issues involved in each case. I also summarized the content of each amicus brief according to whether the brief focused on legal issues, scientific issues, or both, based on the content of the arguments themselves. Finally, I recorded certain

degrees in medicine, natural science, or engineering. See HISTORY OF SCIENCE SOCIETY, *HSS: About the Society*, at http://depts.washington.edu/hssexec/hss_description.html (last visited Aug. 24, 2000).

73. See, e.g., DON K. PRICE, *THE SCIENTIFIC ESTATE* 122-23 (1965); *WHAT IS SCIENCE?* (James R. Newman ed., 1955); JOHN ZIMAN, *RELIABLE KNOWLEDGE: AN EXPLORATION OF THE GROUNDS FOR BELIEF IN SCIENCE* (1978). See also Karl Popper, *Science: Conjectures and Refutations*, in *INTRODUCTORY READINGS IN THE PHILOSOPHY OF SCIENCE* 19 (E. Klemke et al. eds., 1980) (distinguishing science from nonscience on the basis of falsifiability).

74. 526 U.S. 137, 147 (1999) (holding that under the Federal Rules of Evidence, there is no distinction between scientific knowledge and other technical or specialized types of knowledge). In particular, the Court noted that "[t]here is no clear line that divides the one from the others. Disciplines such as engineering rest upon scientific knowledge. Pure scientific theory itself may depend for its development upon observation and properly engineered machinery." *Id.* at 148.

75. Such key phrases include "ERISA cases," "abortion case," and "tort case."

characteristic factors about each amicus brief.⁷⁶ These factors included the following characteristics:

- (1) the amicus's general nature, whether in medicine, science, or engineering;
- (2) whether the amicus possessed a political mandate;⁷⁷
- (3) whether the amicus was filing alone, or with other groups;
- (4) whether, in its statement of interest,⁷⁸ the amicus represented itself as a "neutral" expert on a particular matter,⁷⁹ or as a self-interested representative of a professional group;
- (5) which party, if any, the amicus supported;
- (6) whether the outcome of that support was politically "liberal" or "conservative";⁸⁰

76. The types of characteristics chosen included those that were expected to have the most explanatory value for understanding the nature of amici participation.

77. The presence of a political mandate was determined by evaluating both the party's self-description within the amicus brief, and where available, the party's mission statement on the world wide web.

78. See S. Ct. R. 37.5 (requiring U.S. Supreme Court amicus briefs to contain a statement of "interest of the amicus curiae").

79. Grouping amici based solely on self-interest or neutrality is not as facile as this paper's simple two-category classification makes it seem. For instance, even organizations without a direct economic self-interest may have other interests such as self-promotion of a particular cause. See Mark R. Patterson, *Conflicts of Interest in Scientific Expert Testimony*, 40 WM. & MARY L. REV. 1313, 1327-36 (1999). However, in order to provide a simplified grouping for the amici, this paper relies on the statement of interest of each amici, recognizing potential vested interests in misrepresentation. For example, organizations may file amicus briefs in response to an "arms race conception of amicus participation." Kearney & Merrill, *supra* note 27, at 820-21. ("The great fear . . . may be that the Court will rule adversely to the organization's interest . . . [and] may even cite an amicus brief filed in support of the other side[, leading organization members to] demand an explanation for why the group did not file its own brief to protect its interest."). See also Lee Epstein, *Interest Group Litigation During the Rehnquist Court Era*, 9 J.L. & POL. 639, 675-76 (1993) (suggesting that interest groups may file amicus briefs for reasons of "organizational maintenance"). Some amici also profess to be participating as "neutral" amici in the sense of providing neutral *qua* scientific information but nevertheless acknowledged particular political interests. These amici were designated "experts with politics."

80. Here, the distinction between politically liberal and politically conservative is drawn roughly according to the political typology of a 1999 political survey completed by the Pew Research Center for the People and the Press. See THE PEW RESEARCH CENTER, *More About Us*, at <http://www.people-press.org/moreabout.htm> (last visited Aug. 24, 2000). The Pew Research Center's 1999 Typology divided voters into several groups. See PEW RESEARCH CENTER, *The Political Typology: Profiles of Typology Groups*, at <http://www.people-press.org/typo99sec9.htm> (last visited Nov. 1, 2000) [hereinafter "*Pew Typology*"]. The most conservative group, the "Staunch Conservatives," had the defining values of "[p]ro-business, pro-military, pro-life, anti-gay and anti-social welfare with a strong faith in America." They were also "anti-environmental. Self-defined patriot. Distrustful of government. Little concern for the poor. Unsupportive of the women's movement." *Id.* The "Liberal

(7) who prepared the brief; and

(8) a characterization of the counsel on record for the brief as one of the following: an attorney at a private law firm, an attorney at an advocacy organization, the in-house counsel of an organization, a professor at a law school, or other.

I also tallied factors (3)–(8) for every instance of amici participation by a particular organization or individual because such characteristic factors often differed on a case-by-case basis. In addition, each time a particular organization or individual signed on as an amici, I noted this as a separate instance of participation. All in all, this paper examined 163 separate instances of amici participation.

IV. RESULTS

A. Characteristics of the Amici Themselves

Appendix I lists all the medical, scientific, and technical organizations that have filed amicus briefs before the Supreme Court in the last ten terms, either alone or with other organizations. In all, a total of ninety-two separate amici participated. I ranked the amici first according to the number of filed briefs, and then alphabetically. Table 1 presents the categories of organizations that have participated, ranked by the number of organizations that fall into that category, from largest to smallest.

Democrats” had the defining values of “[p]ro-choice and support civil rights, gay rights, and the environment. Very low expression of religious faith. Most sympathetic of any group to the poor, African-Americans and immigrants. Highly supportive of the women’s movement.” *Id.* These typology groups were treated as typical of “conservatives” and “liberals,” and whenever possible, the positions of the amici in the context of a particular case were grouped into these two categories. Under this typology, for instance, an amicus writing in support of a company in a mass tort suit would be characterized as “conservative,” while an amicus writing in support of the mass tort plaintiffs would be characterized as “liberal.”

Table 1. Categories of Organizations or Individuals Participating as Amici: 1990-1991 Term to February 2000 of 1999-2000 Term.

Amici category	Number of organizations or groups of individual amici	Organizations or groups of individuals falling into this category
Medicine	42	<p>American Academy of Allergy and Immunology; American Academy of Dermatology ; American Academy of Family Physicians; American Association of Neurological Surgeons; American Academy of Neurology; American Academy of Orthopaedic Surgeons; American Academy of Pain Medicine; American Association for Respiratory Care; American Association of Addiction Medicine; American College of Cardiology; American College of Chest Physicians; American College of Emergency Physicians; American College of Obstetricians and Gynecologists; American College of Pain Medicine; American College of Physicians; American College of Preventative Medicine; American College of Radiology; American College of Surgeons; American Dental Association; American Medical Association; American Medical Student Association; American Medical Women’s Association; American Optometric Association; American Psychiatric Association; American Society of Anesthesiologists; American Society of Cataract and Refractive Surgery; American Society of Plastic and Reconstructive Surgeons; American Urological Association; Annals of Internal Medicine; Association of Reproductive Health Professionals; California Medical Association; College of American Pathologists; Congress of Neurological Surgeons; Illinois State Medical Society; Infections Diseases Society of America; Journal of the American Medical Association; New England Journal of Medicine; National Medical Association; San Francisco Psychoanalytic Institute; Society for General Internal Medicine; Union of American Physicians and Dentists; Washington State Psychiatric Association.</p>

Individual or groups of individuals	21	Harold Abelson, Ph.D. et al.; John Allen et al.; Bruce N. Ames, Ph.D. et al.; Stanley Aronowitz, Ph.D. et al.; Nicolas Ashford, Ph.D. et al.; John G. Bartlett, M.D. et al.; Ronald Bayer et al.; Howard B. Beckman, M.D. et al.; Nicolaas Bloembergen, Ph.D.; Stephen N. Bobo, et al.; George R. Caesar, M.D. et al.; John Cairns, Ph.D. et al.; Daryl E. Chubin, Ph.D. et al.; Devra Lee Davis, Ph.D. et al.; Joseph F. Donoghue, Ph.D. et al.; Alvan R. Feinstein, M.D.; Kenneth Heathington, Ph.D. et al.; Peter Orris, M.D. et al.; Kenneth Rothman, Ph.D. et al.; Julian M. Whitaker, M.D. et al.; six former surgeon generals.
Science and engineering	14	American Association for the Advancement of Science; Council of State and Territorial Epidemiologists; Engineers and Scientists Guild, Lockheed Section; Federation of American Societies for Experimental Biology; Institute of Nautical Archeology; National Academy of Engineering; National Academy of Forensic Engineers; National Academy of Sciences; National Association of Academies of Science; National Society of Professional Engineers; Society for American Archeology; Society for California Archeology; Society for Historical Archaeology; Society of Professional Archeologists.
Medical organization with political mandate	8	American Association of Pro-life Obstetricians and Gynecologists; American Association of Pro-life Pediatricians; Association of American Physicians and Surgeons; Doctors for Integrity in Policy Research; Doctors for Responsible Gun Ownership; Physicians for Human Rights; Physicians for Life; Physicians for Reproductive Health.
Medical and legal hybrid organization	3	American Academy of Psychiatry and the Law; American College of Legal Medicine; American Society of Law, Medicine, and Ethics.
Scientific organization with political mandate	3	Advisory Council on Underwater Archaeology; Center for Science in the Public Interest; Global Lawyers and Physicians.
Medical and scientific organization with political mandate	1	American Council on Science and Health
Total	92	

Medical organizations predominate the medical, scientific, or technical organizations and individuals that filed Supreme Court amicus briefs. Of the ninety-two amici, forty-two—close to half of the amici—are purely medical organizations, and another eleven are medical with a political mandate or medical and legal hybrid organizations. Almost all of the organizations that filed at least two amicus briefs in the last ten years are medical groups. The three most repeated players are the American Medical Association with sixteen briefs; the American Psychiatric Association with sixteen briefs; and the American College of Obstetricians and Gynecologists with eight briefs.

The participation of medical, scientific, or technical amici appeared to be evenly distributed with respect to political ideology, with a slight leaning towards support for liberal outcomes.⁸¹ Of the 163 instances of participation, 85 instances can be categorized as liberal, 77 as conservative, and 1 as neither. Notably, more scientists and engineers than physicians and psychiatrists are present in the twenty-one instances in which groups of named individuals, as opposed to formal organizations, participated as amici on Supreme Court briefs. Ten of these groups of individuals are entirely composed of scientists or engineers, six of these are physicians or psychiatrists, and five of these are both.

B. Cases in Which Medical, Scientific, or Engineering Amici Participated

Appendix II summarizes all the cases in which at least one medical, scientific, or technical organization filed an amicus brief. A total of eighty-one briefs were examined. All in all, medical, scientific, and technical amici participated in forty-six cases. The cases are first ranked by the number of filed medical, scientific, or technical amicus briefs, and then by the total number of participating medical, scientific, and technical amici. The types of cases in which medical, scientific, or technical amici participated are presented in Table 2. Tort cases involving the admissibility of expert testimony engendered the most participation with nineteen briefs, followed by abortion cases with eleven briefs, and right-to-die cases with eight briefs. Only two medical, scientific, or technical amici participated in environmental cases.

81. See *id.* for definition of “political ideology,” “liberal,” and “conservative.”

Table 2. Types of Cases in Which Medical, Scientific, and Technical Amici Participated: 1990-1991 Term to February 2000 of the 1999-2000 Term.⁸²

Type of case	Number of amicus briefs filed by medical, scientific, or technical amici	Total number of medical, scientific, or technical amici participating	Number of cases with medical, scientific, or technical amici participation
Tort	19	38	4
Abortion ^a	11	27	6
Right-to-die	8	18	2
Disability ^b	6	9	2
Tobacco ^c	5	13	4
Crime and mental illness ^d	6	6	5
11th Amendment sovereign immunity ^e	4	9	3
ERISA	4	4	3
Professional-Client privilege	3	5	2
Environmental	2	2	2
Medicare claims	1	10	1
Health care management	1	5	1
Antitrust	1	4	1

82. Footnotes (a-e) in Table 2 note the following information:

- a. Includes cases regarding the regulation of abortion protesters as well as regulation of abortion itself.
- b. Includes cases regarding the housing of the disabled and the interpretation of the Americans with Disabilities Act.
- c. Includes tobacco products liability cases.
- d. Includes cases on mentally ill and waiver of defendant's rights; civil commitment proceedings for criminal defendants; and forced use of anti-psychotic medications.
- e. Includes qui tam cases.

Death penalty	1	3	1
Gun control	1	2	1
Alcohol labeling	1	1	1
Census	1	1	1
Gay rights	1	1	1
Gender discrimination	1	1	1
Government contracts	1	1	1
Labor	1	1	1
Medical monitoring	1	1	1
Patent	1	1	1
Total	81	163	46

The seven cases receiving the most briefs were in decreasing order: (1) *Daubert v. Merrell Dow Pharmaceuticals*, a tort case involving scientific evidence that had ten briefs filed by twenty-nine medical, scientific, or technical amici;⁸³ (2) *Rust v. Sullivan*, an abortion case that had four briefs filed by ten medical amici;⁸⁴ (3) *Vacco v. Quill*, a right-to-die case that had four briefs filed by nine medical, scientific, or technical amici;⁸⁵ (4) *Washington v. Glucksberg*, another right-to-die case that had four briefs filed by nine medical, scientific, or technical amici;⁸⁶ (5) *Kumho Tire Co. v. Carmichael*, a products liability tort case that had four briefs written by scientific amici;⁸⁷ (6) *Cipollone v. Liggett Group*, a tobacco products liability case that had four briefs filed by four medical, scientific, or technical amici;⁸⁸ and (7) *General Electric Co. v. Joiner*, a mass tort case involving scientific evidence that had four briefs filed by four medical, scientific, or technical amici.⁸⁹

83. 509 U.S. 579 (1993).

84. 500 U.S. 173 (1991).

85. 521 U.S. 793 (1997).

86. 521 U.S. 702 (1997).

87. 526 U.S. 137 (1999).

88. 505 U.S. 504 (1992).

89. 522 U.S. 136 (1997).

Consistent with the idea of science as a “neutral” discipline,⁹⁰ fifty-two amici professed to be neutral experts. In twenty of the eighty-one briefs, amici acknowledged that pure economic and professional self-interest drove their participation. One amici admitted to having a mixture of self-interest as well as a desire to provide a scientific context. Finally, eight amici stated that political interests motivated their participation.

The briefs themselves contained a wide range of arguments. However, most amici utilized their expertise in their briefs by presenting scientific arguments. Twenty-three briefs provided a mixture of scientific and legal arguments; nineteen focused entirely on providing scientific facts and arguments; eighteen presented entirely legal arguments; eight included a mixture of legal and policy arguments; two involved a mixture of scientific and policy arguments; and one provided a policy argument.

C. Generating the Briefs: When Advocacy Organizations Have Taken the Wheel

In addition to examining the briefs and the amici, I also tallied the counsels of record to get a sense of the avenues through which medical, scientific, and technical organizations come to participate as amici. Some studies suggest that amicus filings are, in part, lawyer-driven.⁹¹ These numbers therefore may reflect how many advocacy groups actively solicited the participation of medical, scientific, and technical organizations and individuals. This may only be half the story though; it is also possible that medical, scientific, and technical organizations refused to join as parties even when advocacy groups solicited them. Without a direct poll of all of the advocacy groups involved, it is impossible to determine the frequency of this phenomenon. However, discussions with advocates suggest that it is rare for medical, scientific, and technical organizations to decline to participate, and that the degree of solicitation is a determinative factor of amici participation.⁹²

90. See *supra* note 44 and accompanying text.

91. See, e.g., TIMOTHY J. O'NEILL, *BAKKE & THE POLITICS OF EQUALITY: FRIENDS AND FOES IN THE CLASSROOM OF LITIGATION* 218 (1985) (noting that in response to a survey, four-fifths of the amicus filers in *Bakke* answered that they came to participate through persuasion by the filing attorneys). But see Gregory A. Caldeira & John R. Wright, *Organized Interests and Agenda Setting in the U.S. Supreme Court*, 82 AM. POL. SCI. REV. 1109, 1112 (1988) (suggesting that despite the attraction to the prestige of Supreme Court litigation, groups scrutinize the costs of participation before actually filing as amici).

92. See Interview with John Echeverria, Counsel for National Audubon Society on the amicus brief in *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992) (No. 91-453), in Washington, D.C. (May 22, 2000) (discussing his experience with *Lucas* and the experience of Patrick Parenteau, Counsel on

The examination of the counsels of record for the amici is presented in Table 3. Although most were from private law firms, a significant number were from advocacy organizations and educational institutions. Relatively few were counsels for the organizations themselves.

Table 3. Number of Briefs for Medical, Scientific, and Technical Organizations as Sorted by Characteristics of the Counsel on Record.

Counsel	Number of amici briefs
Private law firm	49
Advocacy organization	17
Practitioner from educational institution	8
Organizational in-house counsel	6
Solo	1
Total	81

The briefs where the counsels on record came from advocacy organizations and educational institutions advocated more liberal (seventeen briefs) than conservative (eight briefs) outcomes. Advocacy organizations that repeatedly played a role in filing briefs for medical, scientific, and technical amici include Public Citizen (liberal), Lambda Legal Defense and Education Fund (liberal), and various regional legal foundations (conservative).⁹³

V. DISCUSSION

Two major findings emerge from this study. First, far more medical organizations (fifty-three) filed Supreme Court amicus briefs than scientific and technical organizations (seventeen). Second, almost none of the amici examined in this study—medical, scientific, or technical—

record for the scientific amicus brief in *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687 (1995) (No. 94-859)).

93. For a definition of “liberal” and “conservative,” see *supra* note 80 and accompanying text.

anticipated as amici in environmental cases, even when the cases involved health and science concerns similar to those in cases where such amici did participate.

A. *Who Participates and Why?*

The most striking aspect of amici participation is the dominance of medical organizations as compared to scientific or technical organizations participating as amici. This imbalance is not due to a smaller number of scientific organizations; for example, the American Association for the Advancement of Science alone consists of over 250 affiliate scientific organizations. There are several factors which could influence scientific or technical organizations' less frequent amici participation, as compared to medical organizations' amici participation in Supreme Court cases. Those possible factors are the following: the nature of the Supreme Court dockets; different levels of professional self-interest; differing professional cultures; and different levels of advocacy organizations' familiarity with and solicitation of scientific and technical organizations.

1. *Nature of the Supreme Court Docket With a Special Emphasis on Environmental Cases*

The most compelling explanation for the disparity in participation between medical amici and scientific and technical amici is that there are fewer cases before the Court in which scientific information would be relevant as compared to medical information. For example, when the question of whether physician assisted-suicide should be a constitutionally protected right⁹⁴ was before the Court, information in amicus briefs concerning the availability of pain-relieving technology arguably played a role in the Court's inquiry as well as influenced the Court's holding.⁹⁵ In contrast, cases that implicate other areas of science, such as environmental cases, are often resolved on purely legal grounds.⁹⁶ For example, the Court resolved purely on statutory interpretation grounds the question of whether

94. *Vacco v. Quill*, 521 U.S. 793 (1997); *Washington v. Glucksberg*, 521 U.S. 702 (1997).

95. See Frederick R. Parker, Jr., *Washington v. Glucksberg and Vacco v. Quill: An Analysis of the Amicus Curiae Briefs and the Supreme Court's Majority and Concurring Opinions*, 43 ST. LOUIS U. L.J. 469, 536-37 (1999). See also Richard E. Coleson, *The Glucksberg & Quill Amicus Curiae Briefs: Verbatim Arguments Opposing Assisted Suicide*, 13 ISSUES L. & MED. 3 (1997).

96. See Richard J. Lazarus, *Restoring What's Environmental About Environmental Law in the Supreme Court*, 47 UCLA L. REV. 703, 706 (2000) (stating that "[the current Supreme Court Justices] perceive environmental law . . . as merely an incidental factual context" for the resolution of a legal question").

the Resource Conservation and Recovery Act regulated ash generated by the incineration of municipal solid waste.⁹⁷

This explanation, however, rests on the assumption that amici only participate when they believe their briefs will sway a case's outcome.⁹⁸ There are, however, many instances in which medical amici have participated even though their participation may not significantly influence the Court's legal determination. For example, when the Court considered the question of whether the Federal Cigarette Labeling and Advertising Act preempts state law,⁹⁹ amici presented medical information concerning the health effects of tobacco although such information was not particularly relevant to the issue of preemption.¹⁰⁰ Due to the impact on public health that would result from the Court's holding, however, three of the four medical and scientific amicus briefs in that case presented that very kind of medical information, despite the narrowness of the legal question presented.¹⁰¹ In addition, the occasional presence of amici in support of neither party¹⁰² indicates that amici may participate for reasons other than to persuade the Court to rule in favor of a particular petitioner or respondent.

Further, it is possible that the absence of scientific amici, and even the absence of medical amici, in environmental cases exacerbates the Court's failure to appreciate the nonlegal dimensions of its decisions in environmental cases.¹⁰³ Medical organizations may believe that environmental advocacy groups already present information about health concerns and, as a result, decline to participate as amici.¹⁰⁴ In *Ohio Forestry Association v. Sierra Club*, scientific organizations may have believed that either the challenged forestry association or the challenging environmental organizations presented adequate scientific information about a U.S. Forest Service plan's effects on the ecosystem and

97. See *City of Chicago v. Env'tl. Defense Fund*, 511 U.S. 328 (1994).

98. See *supra* text accompanying note 79.

99. See *Cipollone v. Liggett Group, Inc.*, 505 U.S. 504 (1992).

100. See *id.* at 517 ("In our opinion, the pre-emptive scope of [the acts in question] is governed entirely by the express language in § 5 of each Act.").

101. See Brief for the American Medical Association, *Cipollone v. Liggett Group, Inc.*, 505 U.S. 504 (1992) (No. 90-1038); Brief for Six Former Surgeons General, *Cipollone* (No. 90-1038); Brief for the American College of Chest Physicians, *Cipollone* (No. 90-1038).

102. See Brief for the New England Journal of Medicine, *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997) (No. 96-188).

103. See *infra* Part V.B.1.

104. See, e.g., *City of Chicago v. Env'tl. Defense Fund*, 511 U.S. 328 (1994) (challenging incinerator emissions operated by City of Chicago); *Arkansas v. Oklahoma*, 503 U.S. 91 (1992) (challenging EPA decision to allow Arkansas to discharge sewage treatment effluent into stream that would ultimately flow into Oklahoma).

consequently did not participate in the case.¹⁰⁵

The failure on the part of scientific organizations to participate is a mistake that needs to be rectified. The Court may be less likely to take judicial notice of the health and medical dimensions of an environmental case when litigants and advocacy organizations with environmental, or even “anti-environmental,” mandates are the sole presenters of such information. The presence of seemingly neutral parties such as scientific and medical organizations may make the Court more receptive to contextual information concerning environmental effects.¹⁰⁶

2. *Professional Self-Interest*

Another contributing factor to the disparity between medical amici participation and scientific and technical amici participation may be a greater professional self-interest in the resolution of Supreme Court cases on the part of medical groups as compared to scientific and technical organizations. Decisions on abortion,¹⁰⁷ disability,¹⁰⁸ and right-to-die issues¹⁰⁹ have a greater impact on the practice of medicine due to the heavy regulations imposed on medical professionals as a result of such decisions. Therefore, medical organizations may believe that by participating as amici, they have a chance to enhance their professional interests and practices.

In contrast, within the scientific and technical communities, professional prestige may be diminished by participating as amici, with little economic gain to the actual profession.¹¹⁰ Further, judicial constraints

105. See *Ohio Forestry Ass'n v. Sierra Club*, 523 U.S. 726 (1998).

106. See discussion *infra* Part V.B.1.

107. See, e.g., *Hill v. Colorado*, 120 S. Ct. 2480 (2000) (one medical amicus brief); *Schenck v. Pro-Choice Network of W. N.Y.*, 519 U.S. 357 (1997) (one medical amicus brief); *Planned Parenthood of Southeastern Pa. v. Casey*, 510 U.S. 1309 (1994) (two medical amicus briefs); *Nat'l Org. for Women v. Scheidler*, 510 U.S. 249 (1994) (two medical amicus briefs); *Madsen v. Women's Health Ctr.*, 512 U.S. 753 (1994) (one medical amicus brief); *Rust v. Sullivan*, 500 U.S. 173 (1991) (four medical amicus briefs).

108. See, e.g., *Albertson's, Inc. v. Kirkingburg*, 527 U.S. 555 (1999) (one medical amicus brief); *Cleveland v. Policy Management Sys. Corp.*, 526 U.S. 795 (1999) (one medical amicus brief); *Olmstead v. L.C.*, 527 U.S. 581 (1999) (one medical amicus brief); *Bragdon v. Abbott*, 524 U.S. 624 (1998) (one medical amicus brief and one scientific amicus brief); *City of Edmonds v. Oxford House, Inc.*, 514 U.S. 725 (1995) (one medical amicus brief).

109. See, e.g., *Vacco v. Quill*, 521 U.S. 793 (1997) (four medical amicus briefs); *Washington v. Glucksberg*, 521 U.S. 702 (1997) (four medical amicus briefs).

110. Cf. Andrew Lawler, *Selling Science: At What Price?*, 275 *SCIENCE* 296 (1997) (discussing dissent within the scientific community regarding whether or not members should participate in lobbying activities); Daniel Melnick et al., *Participation of Biologists in the Formulation of National Science Policy*, 35 *FED'N PROC.* 1957 (1975) (discussing the phenomenon where the more scientists

hinder the daily practice of science less than the daily practice of medicine because, while control of funding is the primary avenue for exerting political influence over basic scientific research, such control is rarely substantive.¹¹¹ Even in scientific evidence cases where scientific and technical amici participated extensively as expert witnesses,¹¹² the holdings had little effect on practicing scientists and engineers. Nevertheless, the significant presence of many scientific amici in these cases where they had little professional self-interest demonstrates that professional self-interest motives are not determinative of amici participation. Rather, amici in these cases may actually be motivated by the desire to educate the Court about aspects of science, especially in cases that implicate the procedural aspects of science.¹¹³ In a sense, this desire may constitute a broader form of self-interest—an interest in disseminating and enhancing the reputation of the scientific or technical discipline itself.

Interestingly, scientific and technical organizations have failed to participate as amici in environmental cases where they arguably had professional self-interest. Cases involving a challenge to occupational safety and health standards,¹¹⁴ the imposition of fees on the disposal of hazardous waste,¹¹⁵ and a company's failure to file hazardous waste and toxic chemicals reports according to statutory requirements¹¹⁶ directly affected chemical and waste disposal engineers' professional practices. Yet none of these cases motivated professional organizations to participate as amici. Perhaps such professional self-interest was not enough to surpass other participatory barriers discussed in this section of the Article.

participate in political matters, the less they were respected by colleagues).

111. See Steven Goldberg, *The Reluctant Embrace: Law and Science in America*, 75 GEO. L.J. 1341, 1352-64 (1987) (describing how little basic scientific research is governed politically and judicially).

112. See, e.g., *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999); *General Elec. Co. v. Joiner*, 522 U.S. 136 (1997); *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579 (1993).

113. See, e.g., Brief for Nicolaas Bloembergen, *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) (No. 92-102) ("We appear solely as individuals, on our own behalf, to inform the Court of our views as to the appropriate criteria for acceptable scientific evidence . . ."); Brief for Daryl E. Chubin, Ph.D. et al., *Daubert* (No. 92-102) ("Amici seek to advise the Court that the decisions below were premised on a fundamental misunderstanding of the peer review system, a misconception that has the potential of distorting both the way trials are conducted and the way in which the peer review system operates The need to understand these matters transcends the interests of the parties in this case and the unique perspectives of the amici might not otherwise be brought to the attention of the Court.").

114. See *Gade v. Nat'l Solid Wastes Mgmt. Ass'n*, 505 U.S. 88 (1992).

115. See *Chemical Waste Mgmt., Inc. v. Hunt*, 504 U.S. 334 (1992).

116. See *Steel Co. v. Citizens for a Better Env't*, 523 U.S. 83 (1998).

3. Professional Cultures

The difference between medical amici participation and scientific and technical amici participation may also be explained by the different cultures of the professions.¹¹⁷ Because the medical community is already centered around working with human patients,¹¹⁸ physicians, psychiatrists, and other medical professionals may be more likely to participate in other societally centered matters such as legal proceedings. In contrast, becoming insulated from the rest of society may be critical to scientists' initiation into the scientific community.¹¹⁹

In addition, the medical community may be more likely to participate as amici in the Supreme Court because its members are already familiar with the judicial system through malpractice suits.¹²⁰ In contrast, because scientists are more likely to be motivated either internally, through personal desire, or externally, through professional incentives—by the desire to discover, “there is little in their training, professional norms or work environment that gives them a sophisticated understanding of social value conflicts or equips them even to address such conflicts.”¹²¹

However, the fact that more scientists and technical researchers than physicians participate as amici in their individual capacities suggests that the disparity between medical amici and scientific and technical amici participation cannot be entirely explained by differences between the medical community's and the scientific community's culture. Nor are scientists and engineers completely isolated from proceedings that affect society. Instead, scientists and engineers participate regularly in scientific advisory panels to assist agencies in setting standards.¹²² It is possible that

117. See Schuck, *supra* note 4, at 20 (acknowledging differences within particular scientifically trained communities, such as physicians, theoretical scientists, and experimental scientists).

118. See David T. Ozar, *Malpractice and the Presuppositions of Medical Practice*, 3 ANN. HEALTH L. 139, 139-40 (1994) (discussing cultural presuppositions of the medical community, such as “the medical profession's fundamental commitment to the patient's good”).

119. See, e.g., THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 164-65 (1970).

120. See Jonathan Frankel, Note, *Medical Malpractice Law and Healthcare Cost Containment: Lessons for Reformers from the Clash of Cultures*, 103 YALE L.J. 1297, 1315-18 (1994) (describing the effect of the malpractice doctrine on the culture of the medical community, and on the culture of society in general).

121. See Schuck, *supra* note 4, at 17-18 (explaining some of the cultural biases of scientists that lead them to shun nonprofessional forums, “including courtrooms and legislative hearings”).

122. See, e.g., Wagner, *supra* note 16, at 214 n.124, 214-17 (listing various environmental statutes that require peer review of agency's scientific assessments, as well as describing Congress's commission of extensive scientific studies); Goldberg, *supra* note 111, at 1365-70 (describing delegation of regulatory authority to administrative agencies in areas such as the environment). However, Professor Goldberg argues that even for regulatory issues that “combine scientific and policy matters . . . [courts] want to be sure that controversial policy decisions are made openly and

the differences in amici participation levels result from variations between the professional organizations of the different disciplines, rather than variations between the individuals within the disciplines. For example, because medical organizations already participate in Supreme Court cases directly affecting the profession of health care,¹²³ institutional structures are already in place for them to participate in other types of legal proceedings.¹²⁴

4. *Levels of Attorney Familiarity and Advocacy Group Solicitation*

Medical organizations may find it easier than scientific organizations to locate attorneys with appropriate backgrounds to translate their specialized concerns into legal arguments. Because health care and medicine are more heavily regulated than science, it seems reasonable for more lawyers to specialize in health care and medicine than in science and technology law. However, the section membership of the American Bar Association (ABA) tells a different story. The ABA Health Law Section—dedicated to increasing interest in the field of health law¹²⁵—and the ABA Science and Technology Section—dedicated to increasing interest in science, technology, and the law¹²⁶—have membership sizes that are too close to reflect the far more disparate numbers of medical versus scientific and technical organizations' amici participation before the Supreme Court.¹²⁷

It is possible, however, that these membership statistics are not representative of the proportion of attorneys specializing in these areas of the law. For instance, many of the attorneys in the ABA Tort and Insurance Practice Section also have backgrounds in medicine.¹²⁸

persuasively, rather than under the guise of scientific neutrality.” Goldberg, *supra*, at 1367.

In addition, the fact that scientific trade journals, for instance, the American Chemical Society's *Chemical & Engineering News*, have regular columns on the law demonstrates that at least to some extent, these disciplines contextualize relevant legal matters.

123. See, e.g., *Pegram v. Herdrich*, 120 S. Ct. 2143 (2000) (questioning whether a physician, who performs clinical services for patients who are part of an ERISA plan, becomes a fiduciary to that plan); *Roberts v. Galen of Va., Inc.*, 525 U.S. 249 (1999) (presenting the question of whether the Federal Medical Treatment and Active Labor Act allows hospitals to screen individuals who come to hospital emergency rooms seeking assistance).

124. See *infra* Part V.A.4.

125. See AMERICAN BAR ASSOCIATION, *Health Law Section*, at <http://www.abanet.org/health/about.html> (last updated July 25, 2000). The Health Law Section has approximately 8900 members. *Id.*

126. See Email Interview with Alanna Sullivan, Assistant Manager for the Science and Technology Section of the American Bar Association (Apr. 24, 2000). The Science and Technology Section has approximately 6100 members. *Id.*

127. See *supra* notes 125-26.

128. The ABA Tort and Insurance Practice Section contains committees with practices that focus on medical issues, such as the Health and Disability Insurance Law Committee, the Medicine and Law

Therefore, there may be far more lawyers with medical expertise than reflected in the membership of the ABA Health Law Section. Alternatively, it is also possible that attorneys with a background in health and medicine are more likely to practice appellate or Supreme Court litigation than those with backgrounds in science. Such a disparity could render it more likely that medical organizations are better able to find attorneys with the appropriate backgrounds to help them file Supreme Court amicus briefs.

Another contributing factor to the difference between medical group amici participation and scientific and technical group amici participation may be advocacy organizations' solicitation choices. For instance, out of seventeen briefs, counsel from advocacy groups wrote four scientific amicus briefs, eight medical, and five that were both scientific and medical. This suggests that advocacy groups might be predisposed towards soliciting medical organizations to file amicus briefs.¹²⁹ One environmental advocate proposed that the failure of environmental organizations to solicit scientific amici "may reflect an oddity of the environmental culture," in that environmental organizations think of themselves as part scientific and therefore as "perfectly capable and appropriate spokesperson[s] for the scientific viewpoint."¹³⁰ Consequently, lawyers from such advocacy groups would feel it less imperative to solicit scientific amici.

In contrast to amicus briefs filed by advocacy groups, the seven briefs filed by lawyers at educational institutions, who are arguably also participating as advocates for particular political causes, were more evenly split: three scientific, three medical, and two that were medical and scientific. Because of the small sample size, the actual proportion of the split may have little significance. On the other hand, the even distribution may imply that the advocate-counsel affects the choice of amici participation more than the medical, scientific, or technical community's particular professional characteristics. Regardless of whether an amicus

Committee, and the Toxic Torts and Environmental Law Committee. See AMERICAN BAR ASSOCIATION, *The Health and Disability Insurance Committee of the Tort and Insurance Practice Sections*, at <http://www.abanet.org/tips/health/home.html> (last visited Aug. 24, 2000); AMERICAN BAR ASSOCIATION, *The Medicine and Law Committee of the Tort and Insurance Practice Section*, at <http://www.abanet.org/tips/medicine/home.html> (last visited Aug. 24, 2000); AMERICAN BAR ASSOCIATION, *The Toxic Torts and Environmental Law Committee of the Tort and Insurance Practice Section*, at <http://www.abanet.org/tips/toxic/home.html> (last visited Aug. 24, 2000).

129. See *supra* Part IV.C (addressing the role of outside attorneys in soliciting amici).

130. Email Interview with John Echeverria, Director of Environmental Policy Project at the Georgetown University Law Center (May 3, 2000).

would be represented by an attorney from an advocacy organization or an educational institution, it would face the same issues regarding its participation. The amicus must place its name on the front of the amicus curiae brief regardless of which organization represents it. Instead, attorneys may be driving the difference in amicus participation. Perhaps law professors, by virtue of their location at educational institutions, interact with an equal cross-section of scientists and physicians who are also located at these institutions and therefore, are as likely to solicit one type of amicus as the other.

B. Absence of Medical, Scientific, and Technical Amici in Environmental Cases

The relative absence of medical, scientific, and technical amici in environmental cases as compared to other kinds of cases involving medical, scientific, and technical knowledge comprises the second most striking aspect of this study. This absence is significant because general amici¹³¹ often participate in environmental cases before the Supreme Court and those cases often have similar levels of amici participation as other Supreme Court cases.¹³²

Some of the barriers to medical, scientific, and technical amici participation in environmental cases have already been mentioned—namely, the belief that environmental advocacy groups already present relevant information to the Court, the differences in professional self-interest between medical versus scientific and technical amici, the differences in professional cultures between medical versus scientific and technical amici, and the differences in the levels of advocacy group solicitation of medical versus scientific and technical amici. In addition, it may be that environmental cases naturally possess characteristics that generally discourage medical, scientific, and technical amici participation. Many of these environmental cases reach the Court in postures that arguably allow less room for the interjection of scientific matters. For instance, in the last decade, four environmental cases before the Supreme

131. The term “general amici” refers to nonscientific amici or any amici not considered medical, scientific, or technical in nature.

132. For instance, although there was an 82% amici participation level for cases generally before the Court in 1988-1989 term, the proportion of environmental cases with amici participation was 86% in the 1980s. Compare STERN, *supra* note 18, at 564, with Susan Hedman, *Friends of the Earth and Friends of the Court: Assessing the Impact of Interest Group Amici Curiae in Environmental Cases Decided by the Supreme Court*, 10 VA. ENVTL. L.J. 187, 192, app. B at 211, tbl.1 (1991).

Court involved questions of standing, ripeness, and mootness;¹³³ four major environmental cases in the 1990s involved Commerce Clause challenges to waste regulations,¹³⁴ and three involved Fifth Amendment takings challenges.¹³⁵ Scientific groups might perceive these questions as constraints on the scope of the Court's examination, leaving any potential scientific information regarding the environmental issues irrelevant to the case.

1. The Necessity of Medical and Scientific Amici in Environmental Cases

As discussed earlier, the inability to present a clear answer to the question presented does not, and should not, bar amici participation. For example, numerous medical amici participated in cases that addressed whether the Federal Cigarette Labeling and Advertising Act preempted state tort law,¹³⁶ whether pregnant women must be referred beyond Title X facilities in order to receive prenatal care or abortion services,¹³⁷ and whether the U.S. Food and Drug Administration has the statutory authority to regulate tobacco.¹³⁸ In all of these disputes, medical amici focused on

133. *See* *Friends of the Earth v. Laidlaw*, 120 S. Ct. 693 (2000) (discussing whether plaintiffs had standing in citizen suit and whether case was moot when challenged permit holder substantially complied with its permit and subsequently shut down its facility); *Ohio Forestry Ass'n v. Sierra Club*, 523 U.S. 726 (1998) (discussing whether challenge to forest service management plan case was ripe); *Steel Co. v. Citizens for a Better Env't*, 523 U.S. 83 (1998) (discussing whether citizen group had standing to seek redress for past injuries); *Lujan v. Defenders of Wildlife*, 504 U.S. 555 (1992) (discussing whether citizen group had standing to challenge Interior Department regulation interpreting the reach of the Endangered Species Act as not extending to the territory of foreign countries).

134. *See* *C & A Carbone, Inc. v. Town of Clarkstown*, 511 U.S. 383 (1994) (deciding Commerce Clause challenge to flow control ordinance requiring all of a certain type of waste to be generated within town); *Oregon Waste Sys., Inc. v. Dep't of Env't'l Quality of the State of Or.*, 511 U.S. 93 (1994) (resolving Commerce Clause challenge to state statute imposing higher surcharge for disposal of waste originating out of state); *Chemical Waste Mgmt., Inc. v. Hunt*, 504 U.S. 334 (1992) (adjudicating Commerce Clause challenge to fees on disposal of hazardous waste generated outside state); *Fort Gratiot Sanitary Landfill, Inc. v. Mich. Dep't of Natural Resources*, 504 U.S. 353 (1992) (resolving Commerce Clause challenge to state prohibition on private landfill operators from accepting solid waste not generated in county in which landfill was located).

135. *See* *City of Monterey v. Del Monte Dunes at Monterey, Ltd.*, 526 U.S. 687 (1999) (resolving regulatory takings challenge to city's proposal of increasingly strict conditions after rejection of five successive development plans); *Dolan v. City of Tigard*, 512 U.S. 374 (1994) (deciding regulatory takings challenge to city planning commission's mandate on building permit); *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992) (adjudicating regulatory takings challenge to restrictions on development of beachfront property).

136. *See* *Cipollone v. Liggett Group, Inc.*, 505 U.S. 504 (1992).

137. *See* *Rust v. Sullivan*, 500 U.S. 173 (1991).

138. *See* *FDA v. Brown & Williamson Tobacco Corp.*, 120 S. Ct. 1291 (2000).

providing medical information concerning the medical and health implications of the case, rather than directly addressing the legal issues presented in the case. Without medical amici participation, the Court would not have been presented with a full discussion of the stakes involved in those cases.

*a. The Unique Perspectives of Medical and Scientific Amici:
Babbitt v. Sweet Home Chapter of Communities for a Great
Oregon*

Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, a case involving statutory interpretation, is the only environmental case in this study where a scientific or technical group participated on an amicus brief without other nonscientific groups.¹³⁹ Certain cases involving questions of statutory interpretation may provide more room for the interjection of medical and scientific concerns than other types of cases. In *Sweet Home*, the Court sought to determine the reasonableness of the Interior Department's interpretation of the language of "harm" under the Endangered Species Act as including "significant habitat modification or degradation where it actually kills or injures wildlife."¹⁴⁰

The scientific amicus brief—written by fourteen prominent scientists in fields ranging from biology to paleontology—illustrates a model brief for scientists and scientific organizations in other environmental cases.¹⁴¹ The brief specifically emphasized the biological impacts and implications of extinction, citing to peer-reviewed scientific journals such as *Nature*.¹⁴² The brief also acknowledged the limitations of its writers:

As scientists, amici do not normally engage in statutory construction. Rather, we try to understand and communicate, as best we can, the science that underlies endangered species conservation efforts. But when a legal interpretation like the one at issue before this Court has such devastating consequences for the objects of our profession, we feel compelled to speak.¹⁴³

139. 515 U.S. 687 (1995).

140. *Id.* at 690.

141. See Brief for John Cairns, Jr. et al., *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687 (1995) (No. 94-859).

142. See *id.* at nn.15-16.

143. Brief for John Cairns, Jr. et al., *Babbitt* (No. 94-859). The amicus briefs of some of the scientific amici in *Daubert* contained similar limiting language. See, e.g., Brief for the American Association for the Advancement of Science and the National Academy of Sciences, *Daubert v.*

Despite admitting to limitations in their knowledge of the law, the amici proceeded to apply a form of statutory interpretation in their brief.¹⁴⁴ It passionately described many indirect ways through which pesticides can cause severe injury to individual animals, ranging from the secondary pesticide poisoning of bald eagles to the disruption of the traditional nesting area of sea turtles.¹⁴⁵ It elaborated on the nature of species viability.¹⁴⁶ It cited to published works of studies conducted by one of the amici himself.¹⁴⁷ Yet the brief is not written in the dry manner often caricatured as essential to science, but in the passionate manner of individuals devoted to studying science and understanding nature.

The ability to present environmental concerns from this perspective is unique to scientific amici, due to their focus on the physical world.¹⁴⁸ In her discussion of the regulation, Justice O'Connor acknowledged that the statutory language in *Sweet Home* clearly applies "to significant habitat modification that kills or physically injures animals which, because they are in a vulnerable breeding state, do not or cannot flee or defend themselves, or to environmental pollutants that cause an animal to suffer physical complications during gestation."¹⁴⁹ Although she did not cite to a particular brief, her examples are precisely those raised by the scientific

Merrell Dow Pharm., Inc., 509 U.S. 579 (1993) (No. 92-102) ("Amici have filed this brief to explain those factors that are particularly relevant to the case pending before the Court and the way in which scientists apply them in the day-to-day practice of their profession. Although amici do not comment directly on the available evidence . . ."); Brief for Professors Kenneth Rothman et al., *Deubert* (No. 92-102) ("We are practicing scientists, not lawyers. We cannot and do not opine as to legal issues such as whether federal judges have the authority to supplement enacted rules for excluding evidence. Rather, we write to explain how the lower courts have misconstrued the role of epidemiology and its limits and scope in modern science.").

144. Brief for John Cairns, Jr. et al., *Babbitt* (No. 94-859) (noting with respect to the Court of Appeals' requirement that harm involve direct injury to an individual member of a species that "[t]here simply is no biological basis for such artificial requirements"). Rather than an "artificially" narrow definition of harm, these amici urged the Court to adopt a practical, but more expansive, interpretation that would encompass the injuries described in their brief. *See id.*

145. *See id.*

146. *See id.*

147. *See id.* (citing EDWARD O. WILSON, *THE DIVERSITY OF LIFE* 280 (1993)).

148. *See* Mark A. Tumeo, *Understanding Between Scientists and Attorneys for Better Service to Business and Community*, 46 *FED. LAW*, Aug. 1999, at 19 ("Scientists and engineers take facts (physical laws, laws of material behavior, biological principles, etc.) and use them like pieces of a puzzle to create the whole picture. The fundamental premise of this approach is that if you understand all the parts, you will arrive at the true and correct whole picture."); *see also* Goldberg, *supra* note 111, at 1344 ("Many scientists do care greatly about the ultimate practical impact of their work, but that concern is often secondary to the fundamental search for knowledge."); Goldberg, *supra*, at 1349 ("Scientists looking for empirically verifiable truth have to believe there is some kind of order in their universe, whether it is expressible in traditional cause-and-effect terms or in probabilistic equations.").

149. *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687, 710 (1995).

amicus brief.¹⁵⁰

Although the scientific amicus brief in *Sweet Home* presented information similar to that presented in briefs by nonscientific amici,¹⁵¹ it is possible that the affirmation of this information by scientists persuaded Justice O'Connor, who is not a traditional supporter of environmental claims,¹⁵² to concur with the majority's expansive interpretation of the Endangered Species Act. Scientific information may otherwise be lost or ignored when presented by nonscientific advocacy groups and individuals, or even a mixture of scientific and nonscientific parties. For example, in *Lucas v. South Carolina Coastal Council*,¹⁵³ where coastal scientists participated as named amici in conjunction with advocacy organizations such as the Chesapeake Bay Foundation, the Court did not directly address the scientific information presented by the amici.¹⁵⁴ There, the scientists' "distinctive viewpoint probably got lost in the shuffle."¹⁵⁵

b. The Presentation of the Distinct Elements of Environmental Law

Scientific and technical amici may be the groups or individuals most able to educate the Court about what is "environmental about environmental law."¹⁵⁶ In his recent article examining the votes of Supreme Court Justices on environmental cases, Professor Lazarus argued that the Supreme Court's poor reception to environmental advocates' claims results from the Justices' failure to appreciate "environmental law as a distinct area of the law."¹⁵⁷ Lazarus argues that environmental law constitutes a distinct area of the law because environmental injuries have six particular characteristics: (1) many injuries are irreversible, catastrophic, and continuing in nature; (2) the injuries are physically distant in nature; (3) the injuries are temporally distant in nature; (4) the

150. See Brief for John Cairns et al., *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687 (1995) (No. 94-859).

151. See Brief for Friends of Animals, *Babbitt v. Sweet Home Chapter of Communities for a Great Or.*, 515 U.S. 687 (1995) (No. 94-859) (describing how habitat modification causes damage to various species of animals across the United States).

152. See Lazarus, *supra* note 96, at 729 (noting Justice O'Connor's relatively low score on the Article's Supreme Court "environmental scorecard").

153. 505 U.S. 1003 (1992).

154. See Brief for Nueces County et al., *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992) (No. 91-453) (presenting information on sea-level rise and coastal ocean processes and including six coastal scientists as named amici).

155. Email Interview with John Echeverria, *supra* note 130.

156. Lazarus, *supra* note 96, at 703. See also J. William Furrell, *The Ungreening of the Court*, 9 ENVTL. FORUM, Jan.-Feb. 1992, at 12.

157. Lazarus, *supra* note 96, at 706.

risk assessment of each injury is uncertain; (5) the injuries may have multiple causes; and (6) the injuries are noneconomic and nonhuman in character.¹⁵⁸

All of these distinguishing features of environmental law and injuries touch on matters of science. Indeed, environmental science textbooks in their introductions often invoke similar features—physical distance, temporal distance, and multiple causation.¹⁵⁹

This is not to say that scientific findings alone should be used to determine the Court's holdings in environmental cases. Science itself cannot and should not provide the value-judgments inherent in most environmental law questions.¹⁶⁰ Science cannot and should not tell us how to value different species, different risks, and different environmental consequences. Further, scientific tools, such as risk assessment, may contain internal biases which neglect particularized health risks in poor communities and communities of color.¹⁶¹

158. *See id.* at 745-48. In particular, Professor Lazarus explains that many environmental injuries are “noneconomic” because there is often “no readily available market analogue” by which to calculate their costs. *Id.* at 748. Environmental injuries are “nonhuman” when they primarily affect animals or their habitat, even though such effects may ultimately lead to human injuries. *See id.*

159. *See, e.g.*, CHEMICAL ANALYSIS OF THE ENVIRONMENT AND OTHER MODERN TECHNIQUES v (Sut Ahuja et al. eds., 1973) (stating that “[w]ith the rise in general awareness of the *effects of trace chemicals in the environment on man's health*, it has been realized that traditional methods of analysis are often inadequate”) (emphasis added); ELDON D. ENGER & BRADLEY F. SMITH, ENVIRONMENTAL SCIENCE: A STUDY OF INTERRELATIONSHIPS xi (4th ed. 1992) (“The concept of *interrelatedness* is central to the text; understanding this concept will enable students to grow in their capacity for intelligent environmental decision making.”) (emphasis added); KRISHNAN RAJESHWAR & JORGE G. IBANEZ, ENVIRONMENTAL ELECTROCHEMISTRY: FUNDAMENTALS AND APPLICATIONS IN POLLUTION ABATEMENT 1 (1997) (“Every day our atmosphere, water resources and soil are becoming contaminated with human-made pollutants at *levels that are unnoticed*, and thus *far more environmentally potent in a cumulative sense*. We understand fairly well the health hazards associated with the acute overdose of many chemicals, but the same cannot be said about the *long-term consequences* of chronic exposure to them.”) (emphasis added); AMOSTURKETAL., ENVIRONMENTAL SCIENCE 7 (2d ed. 1978) (“[M]any environmental disruptions have a combined effect—they pollute now and they pose a *future threat* to global systems In such instances public policy is focused on the immediate pollution problem, but the overhanging uncertainties add a measure of anxiety, and perhaps urgency, to the public response.”) (emphasis added).

160. *See* Kathy Bunting, *Risk Assessment and Environmental Justice: A Critique of the Current Legal Framework and Suggestions for the Future*, 3 BUFF. ENVTL. L.J. 129, 135-37 (1995) (discussing how, although risk assessments use scientific methods to calculate risk, their determinations still include values and biases); Holly Doremus, *Listing Decision Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029 (1997) (arguing that environmental advocates should not rely on science to protect endangered species because science cannot answer many value-laden questions).

161. *See* Bunting, *supra* note 160, at 135-37; Brian D. Israel, *An Environmental Justice Critique of Risk Assessment*, 3 N.Y.U. ENVTL. L.J. 469 (1994); Robert R. Kuehn, *The Environmental Justice Implications of Quantitative Risk Assessment*, 1996 U. ILL. L. REV. 103. *Cf.* Eileen Gay Jones, *Risky Assessments: Uncertainties in Science and the Human Dimensions of Environmental Decision Making*, 22 WM. & MARY ENVTL. L. & POL'Y REV. 1 (1997) (describing how risk assessments should be

However, science can provide context for value-based decisions. Regular participation by medical, scientific, and technical amici as information providers may be necessary for the Court to acknowledge the environmental aspects of environmental cases even when the Court focuses its attention on legal grounds. Presentation of information by scientists may reach certain Justices in ways that presentations by environmental advocates do not and cannot.¹⁶² For instance, a study of the Court's citation to amicus briefs in environmental cases from 1970 to 1988 found that although amicus briefs were filed by several repeat-player environmental groups, those of the Wilderness Society were among the only ones to which the Court cited as having influence on its decisions.¹⁶³ One proffered explanation was the "reputation for reliability"¹⁶⁴ of the Wilderness Society's counsel, suggesting that the Court did not perceive the other repeat environmental advocacy groups' amicus briefs as reliable. In contrast, the majority in *Kumho Tire Co.*,¹⁶⁵ *Joiner*,¹⁶⁶ and *Daubert*,¹⁶⁷ cited with approval several amicus briefs by scientific groups and individuals even though none were repeat players.¹⁶⁸ This indicates that at least in certain contexts, the Court perceives scientific amici as more "reliable" than nonscientific amici. In fact, medical, scientific, and technical amici even inform the Court about the limitations of science by

aligned with public participation processes).

162. Cf. Lazarus, *supra* note 96, at 763-71 (arguing that personal experiences of the Justices may lead to some being less receptive to environmental claims than others). Professor Lazarus suggests that Justice Powell's experience as "legal counsel for regulated industry in a private law firm" may have led him to be more wary of pollution claims, while Justice Kennedy's experience as a resident of California—with its earthquakes and mudslides—may have enhanced his sensitivity to the detrimental effects of developing unsuitable lands. *Id.* at 765. In addition, he notes that "[e]ach [environmental case] presents the Justices with a story about the way in which laws affect the quality of life and an opportunity to try to tap into the Justices' own backgrounds in the telling of that story." *Id.* at 768-69. Scientific organizations can present yet another perspective through which to tap into the backgrounds of some of the Justices. Cf. *supra* Part V.B.1.a. discussion of Justice O'Connor.

163. See Hedman, *supra* note 132, at 204-05.

164. *Id.* at 205 (citing Telephone Interview by Susan Hedman with James Mooman, Attorney for Wilderness Society et al. (Mar. 27, 1989)).

165. 526 U.S. at 148 (1999) (citing Brief for National Academy of Engineering and Brief for John Allen et al. (No. 97-1709)); *id.* at 150 (citing Brief for Stephen N. Bobo et al. and Brief for United States (No. 97-1709)); *id.* at 156 (citing Brief for National Academy of Forensic Engineers (No. 97-1709)).

166. 522 U.S. at 148 (1997) (citing Brief for New England Journal of Medicine et al. (No. 96-188)).

167. 509 U.S. at 590 (1993) (citing Brief for Nicolaas Bloembergen et al. and Brief for American Association for the Advancement of Science et al. (No. 92-102)); *id.* at 596 (citing Brief for Ronald Bayer et al. (No. 92-102)).

168. See *Kumho Tire Co.*, 526 U.S. at 148 (citing Brief for Rubber Manufacturers Association (No. 97-1709)); *Joiner*, 522 U.S. at 148 (citing Brief for Trial Lawyers for Public Justice (No. 96-188)).

presenting metascientific information. Moreover, in *Kumho Tire Co.*,¹⁶⁹ *Joiner*,¹⁷⁰ and *Daubert*¹⁷¹ the Court found this type of metascientific information most useful when presented by scientific amici. Indeed, at least one environmental scholar argues that metascientific information is the type of information that is most lacking in environmental decision making today.¹⁷²

Even when they may not directly persuade the Court to rule for a particular party, scientific and technical organizations may help the Court contextualize the environmental effects of its holdings. For example, the participation of scientific amici in *City of Chicago v. Environmental Defense Fund*¹⁷³ probably would not have had a direct effect on the Court's holding. In this case the Court, in support of the Environmental Defense Fund, held that ash generated by the incineration of municipal solid waste was subject to Resource Conservation and Recovery Act regulations governing hazardous waste, however, despite the absence of scientific amici.¹⁷⁴

Had scientific amici participated, they might have provided valuable information concerning the health risks posed by the generated ash and the process of ash generation itself. Such scientific and technical amici participation could have influenced the Court to recognize in its opinion the risks posed by the changing nature of waste processing much in the same way that medical information about the dilation and extraction method allowed the Court to better understand the risks involved in the abortion procedure challenged in *Stenberg v. Carhart*.¹⁷⁵ Or perhaps the Court would have acknowledged procedural limitations in evaluating unknown risks, much in the same way that scientific amici information on the nature of peer review and scientific discovery allowed the Court to directly examine the role of peer review in *Daubert*.¹⁷⁶ Instead, Justice

169. 526 U.S. at 148 (1999).

170. 522 U.S. at 148, 149 (1997).

171. 509 U.S. at 590 (1993).

172. See Wagner, *supra* note 16, at 193 (arguing that “[n]ot only must policy makers gather available positive knowledge, but they also must appreciate where this information leaves off and the various, scattered uncertainties begin”). Such appreciation of the limitations of science would not only be useful to the policymakers addressed by Professor Wagner, but to the Court as well. Without such appreciation, policymakers and the Court may overestimate the extent to which science can provide quantitative answers to questions such as the risks and benefits of particular activities. Nevertheless, Professor Wagner notes that “there is rarely a generally accessible discussion of scientific knowledge gaps in the literature.” *Id.*

173. 511 U.S. 328 (1994).

174. See *id.*

175. 120 S. Ct. 2597, 2612-13 (2000).

176. 509 U.S. 579.

Scalia's opinion for the majority in *City of Chicago* makes no acknowledgement of the environmental context of the case.¹⁷⁷

Finally, participation by scientific and technical amici in environmental cases may slowly change the Court's perception of environmental law. Professor Lazarus notes that "[t]he cumulative effect of multiple stories . . . can over time significantly affect the way Justices decide what cases to hear and how to decide the legal issues presented."¹⁷⁸ Such could be true for the participation of scientific amici in environmental cases. Scientists' long-term presentation of environmental consequences could aid the Court in understanding the environmental elements of environmental law. Just as the Court relies on legal precedent, long-term amici participation in environmental cases will provide the Court with a history of scientific, medical, and technical knowledge on which it can rely.

2. American Trucking Associations: *The Opportunity For a Normative Change?*

When the Supreme Court granted certiorari¹⁷⁹ for *American Trucking Associations v. EPA*,¹⁸⁰ it presented the scientific and medical communities with an important opportunity to participate as amici.¹⁸¹ *American Trucking* involves the constitutionality of EPA standards regarding nonthreshold pollutants.¹⁸² Here, amici presentation of risk-assessment data, as well as information about the process and nature of risk assessments, may aid the Court significantly in its full resolution of the case. Further, this case lacks some of the traditional barriers to scientific amici participation and contains affirmative reasons for scientific and medical organizations to file amicus briefs. The adjudication of *American Trucking* involves (to some extent) a statutory construction rather than a standing, Commerce Clause, or takings issue; its potential

177. 511 U.S. 328 (1994). See also Lazarus, *supra* note 96, at 737 (criticizing Justice's Scalia's failure to acknowledge the environmental context of *City of Chicago v. Environmental Defense Fund*).

178. Lazarus, *supra* note 96, at 769. Professor Lazarus urges more effective advocacy before the Court through the careful presentation of stories including the "legal issues and facts of the individual cases brought to the Court's attention." *Id.* at 768.

179. 68 U.S.L.W. 3496 (U.S. May 22, 2000) (No. 99-1257), *cross-petition granted*, 68 U.S.L.W. 3566 (U.S. May 30, 2000) (No. 99-1426).

180. 175 F.3d 1027 (D.C. Cir. 1999), *rev. denied in part, granted in part*, 195 F.3d 4 (D.C. Cir. 1999) (denying review with respect to issue of nondelegation), *petition for cert. granted*, 68 U.S.L.W. 3496 (U.S. May 22, 2000) (No. 99-1257), *cross-petition granted*, 68 U.S.L.W. 3566 (U.S. May 30, 2000) (No. 99-1426).

181. 175 F.3d at 1033-39.

182. 68 U.S.L.W. 3496 (U.S. May 22, 2000) (No. 99-1257), *cross-petition granted*, 68 U.S.L.W. 3566 (U.S. May 30, 2000) (No. 99-1426).

outcome could affect amici's professional self-interests; the scientific community is familiar with the case's legal issues; and the legal community is familiar with the case's scientific issues. Consequently, it is not surprising that some members of the scientific and medical community have participated as amici.

a. The D.C. Circuit Opinion and the Petitions for Certiorari

The U.S. Court of Appeals for the D.C. Circuit determined that the EPA's more stringent standards regarding nonthreshold pollutants, such as ozone and particulate matter, violated the nondelegation doctrine.¹⁸³ In doing so, it stated that "[a]lthough the factors EPA uses in determining the degree of public health concern associated with different levels of ozone and [particulate matter] are reasonable, EPA appears to have articulated no 'intelligible principle' to channel its application of these factors; nor is one apparent from the statute."¹⁸⁴ Thus, the court found that the EPA had construed Section 109 of the Clean Air Act (CAA)¹⁸⁵ "so loosely as to render them unconstitutional delegations of legislative power."¹⁸⁶

Section 109 of the CAA, under which the EPA set its National Ambient Air Quality Standards (NAAQS) for nonthreshold pollutants, states that the standard must be set at the level "requisite to protect the public health" with an "adequate margin of safety."¹⁸⁷ Section 109 requirements apply to any revision of NAAQS as well.¹⁸⁸ The pollutants at issue in *American Trucking* are nonthreshold pollutants which introduce the possibility of adverse health impacts at any exposure level above zero.¹⁸⁹ In doing so, the court held that the EPA must explain the "degree of imperfection permitted" for nonthreshold pollutants in order to set the

183. See *American Trucking*, 175 F.3d at 1034; U.S. CONST. art. I, § 1 ("All legislative Powers herein granted shall be vested in a Congress of the United States . . ."). Under this doctrine, if Congress states no "intelligible principle" in vesting power to the executive, it violates Article I. See, e.g., *J.W. Hampton, Jr. & Co. v. United States*, 276 U.S. 394, 409 (1928).

184. *American Trucking*, 175 F.3d at 1034.

185. 42 U.S.C. § 7409(b).

186. *American Trucking*, 175 F.3d at 1034.

187. 42 U.S.C. § 7409(b)(1).

188. 42 U.S.C. § 7409(d)(1).

189. See National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856, 38,863 (July 18, 1997) (to be codified at 40 C.F.R. pt. 50) (identifying no level for ozone exposure at which the EPA could conclude that no "adverse" effects were likely to occur); National Ambient Air Quality Standards for Particulate Matter: Proposed Decision, 61 Fed. Reg. 65,638, 65,651 (Dec. 13, 1996) (to be codified at 40 C.F.R. pt. 50) (noting that the most important factor "influencing the uncertainty associated with risk estimates is whether or not a threshold concentration exists below which particulate matter associated health risks are not likely to occur").

standard at any level other than zero.¹⁹⁰ In doing so, the court found that the EPA failed to explain adequately why, if it had the grounds to move the ozone standard from 0.09 parts-per-million (ppm) to 0.08 ppm, it did not have equal grounds to move to 0.07 ppm or lower.¹⁹¹

The court rejected the three justifications proffered by the EPA, as well as a justification, although not made by the EPA, commonly made to defend challenges to agency standards. First, the EPA argued that permanent and irreversible harms occurred above 0.08 ppm, and only transient and reversible harms occurred below that level.¹⁹² The court found such a distinction unclear in the EPA's final rule for ozone.¹⁹³ Second, the EPA noted that it relied on the recommendations of the Clean Air Act Scientific Advisory Committee (CASAC), an independent advisory committee consisting of medical doctors, epidemiologists, toxicologists, and environmental scientists,¹⁹⁴ when it established the 0.08 ppm standard. The court dismissed the EPA's reliance on CASAC, stating that whether the EPA acted under lawfully delegated authority was a legal question, not a scientific inquiry.¹⁹⁵ Third, the EPA argued that it chose the 0.08 ppm level rather than the 0.07 ppm level because in some areas of the country, natural background levels of ozone exceed 0.07 ppm, but not 0.08 ppm.¹⁹⁶ The court rejected this argument as well, questioning whether the EPA had actually "explicitly adopted" such a reading.¹⁹⁷ Finally, the court dismissed an argument not made by the EPA in this case, but often raised in such standard-setting cases: that below a certain level, greater uncertainty exists.¹⁹⁸ In doing so, the court stated that such a rationale, without a principle that "reveals how much uncertainty is too much," would constitute standard setting without an intelligible principle.¹⁹⁹

The court also rejected an argument brought by the industry petitioners and some amici in support of the petitioners: namely that the EPA was required to consider cost in revising its standards.²⁰⁰ The court reiterated

190. *American Trucking*, 175 F.3d at 1034.

191. *See id.* at 1035.

192. *See* National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. at 38,868.

193. *See American Trucking*, 175 F.3d at 1035; National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. at 38,868.

194. CASAC was created pursuant to Section 109 of the Clean Air Act. 42 U.S.C. § 7409(d)(2).

195. *See American Trucking*, 175 F.3d at 1036.

196. *See* National Ambient Air Quality Standards for Ozone, 62 Fed. Reg. 38,856, 38,868 (July 18, 1997) (to be codified at 40 C.F.R. pt. 50).

197. *American Trucking*, 175 F.3d at 1036.

198. *See id.*

199. *See id.*

200. *See id.* at 1040-41.

its earlier ruling in *Lead Industries*,²⁰¹ holding that the CAA and its legislative history “[made] clear that economic considerations play no part in the promulgation of [NAAQS].”²⁰² Therefore, the EPA was precluded from considering costs in implementing NAAQS standards.

The Supreme Court granted the EPA’s petition for certiorari on May 22, 2000.²⁰³ On May 30, 2000, the Supreme Court granted certiorari on the cross-petition filed by the industry, to be heard “in tandem” with the underlying case.²⁰⁴ The industry cross-petition urged the Court to consider overturning *Lead Industries* and allow the EPA to use the relative costs of regulations to provide an “intelligible” rationale for its decision making.²⁰⁵

b. The Rejection of the Use of Scientific Studies

The D.C. Circuit Court’s ruling, though founded on the nondelegation doctrine, explicitly rejected the use of science as a guide to provide intelligible principles.²⁰⁶ Not only did the court dismiss the EPA’s reliance on peer-reviewed studies,²⁰⁷ it explicitly stated that “the question whether EPA acted pursuant to lawfully delegated authority is not a scientific one,”²⁰⁸ and ignored other relevant sections of the CAA, under which scientific knowledge is explicitly provided as a guiding criterion for standard setting.²⁰⁹

201. *Lead Indus. Ass’n v. EPA*, 647 F.2d 1130 (D.C. Cir. 1980).

202. *American Trucking*, 175 F.3d at 1040 (citing *Lead Indus.*, 647 F.2d at 1148).

203. 68 U.S.L.W. 3496 (U.S. May 22, 2000) (No. 99-1257).

204. 68 U.S.L.W. 3566 (U.S. May 30, 2000) (No. 99-1426).

205. See *American Trucking Associations v. EPA*, 195 F.3d 4 (D.C. Cir. 1999), *cross petition for cert. filed for American Trucking Associations* at 14-27, *American Trucking Association v. Browner*, 68 U.S.L.W. 3566 (2000) (Nos. 99-1426, 99-1431, 99-1442).

206. See *American Trucking*, 175 F.3d at 1036.

207. See National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,652, 38,656 (July 18, 1997) (to be codified at 40 C.F.R. pt. 50); see also *American Trucking*, 175 F.3d at 1060 (Tatel, J., dissenting) (“The EPA set the annual standard for PM_{2.5} pollution at the lowest level where it had confidence that the epidemiological evidence (filtered through *peer-reviewed, published studies*) displayed a statistically significant relationship between air pollution and adverse public health effects.”) (emphasis added).

208. *American Trucking*, 175 F.3d at 1036.

209. See 42 U.S.C. § 7408(a)(2) (directing the EPA to base standards on criteria that “accurately reflect the *latest scientific knowledge* useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air . . .”) (emphasis added).

Further, the decision does not acknowledge the inherent scientific uncertainty and time constraints attendant to any study of health effects.²¹⁰ The existence of such limitations should be acknowledged in the application of a legal standard such as the nondelegation doctrine.²¹¹ For instance, at the time the EPA issued its new rules regarding particulate matter, it did not know the actual biological mechanism for the health problems allegedly caused by particulate matter. However, recent studies by researchers at the Harvard School of Public Health have been successful in identifying possible biological mechanisms linking particulate matter to human health dangers.²¹² Such continuous additions and revisions to the knowledge base are typical of risk assessment.²¹³ The CAA recognizes this evolving nature of scientific contributions to risk assessment. For example, the CAA requires the EPA to base its standards

210. See Brief for Massachusetts and New Jersey, *Browner v. American Trucking Associations*, 2000 WL 1010282 at *41-42 (No. 99-1257) (“Given the dynamic nature of scientific inquiry and effects, and mechanisms of effects, on human health and welfare, it would be quite impossible to devise in advance a catch-all, quantitative standard to govern all decisions setting NAAQS.”); cf. Lazarus, *supra* note 96, at 759 (Environmental problems often “require a degree of ongoing revision and fine-tuning in light of changing and uncertain information that often resists the kind of sharp delineations between those who legislate and those who merely execute the laws. It is for this reason that long-moribund nondelegation issues have recently arisen in the environmental context.”). Some researchers attempt to study the uncertainty of risk values obtained through risk assessments. See Janet E. Kester et al., *Human Health Risk Assessment*, in KENNETH W. AYERS ET AL., ENVIRONMENTAL SCIENCE AND TECHNOLOGY HANDBOOK 37, 65-69 (1994). Such analyses, known as uncertainty analyses, nevertheless involve certain assumptions—such as “[c]hemical concentrations remain constant over the exposure period” and “[e]xposures remain constant over time”—that themselves may contain uncertainties. Kester, *supra*, at 66; see also Janet E. Kester et al., *Ecological Risk Assessment*, in KENNETH W. AYERS ET AL., ENVIRONMENTAL SCIENCE AND TECHNOLOGY HANDBOOK 75, 92-93 (1994) (noting that uncertainty in estimates of ecological risk may be greater than those for human health risks). Such uncertainty analyses, while important for the characterizations of risk, should not be confused with the amount of scientific uncertainty involved. See Sanford E. Gaines, *Science, Politics, and the Management of Toxic Risks Through Law*, 30 JURIMETRICS J. 271, 279-82 (1990).

211. See Brief for the Petitioner at *28, *Browner* (No. 99-1257) (“To hold EPA to the court’s novel demand for precision would restrict the agency’s ability to act on a precautionary basis in the face of scientific uncertainties, thereby potentially eroding the public health protection Congress intended NAAQS to afford.”).

212. See Pamela Najor, *Air Pollution: Particulate Matter May Lead to Increased Probability of Heart Problems, Study Finds*, DAILY ENV. REPT., Feb. 23, 2000, at A-8 (BNA 2000). The article describes a recent study by Dr. John Godleski and other researchers at the Harvard School of Public Health. See John Godleski et al., *Mechanisms of Morbidity and Mortality from Exposure to Ambient Air Particles*, Report No. 91, in HEALTH EFFECTS INSTITUTE RESEARCH REPORT, Feb. 18, 2000, at <http://www.healtheffects.org/Pubs-recent.htm> (last visited Nov. 3, 2000).

213. See John S. Applegate, *A Beginning and Not an End in Itself: The Role of Risk-Assessment in Environmental Decision-Making*, 63 U. CIN. L. REV. 1675 (1995) (“[Principles for risk assessment suggested by the author] are intended to provide a general policy framework for evaluating and reducing risks, while recognizing that risk analysis is an evolving process, and agencies must retain sufficient flexibility to incorporate scientific advances.”).

on criteria that “accurately reflect the *latest scientific knowledge*.”²¹⁴ Nevertheless, the majority opinion in *American Trucking* interpreted any guiding principle that allows for such developments as inconsistent with the nondelegation doctrine.

c. What Medical and Scientific Organizations Can Provide and Have Provided the Court

American Trucking presented a significant opportunity for scientific and medical groups to provide information about risk assessment to the Court. Regardless of which party a group supported, its discussion of risk assessment would have informed the Court about the context behind the nondelegation doctrine issue²¹⁵ both by helping the Court determine what is “requisite to protect the human health” and what constitutes an “adequate margin of safety.”²¹⁶ Further, such information would have been beneficial not only to the Court’s resolution of the nondelegation issue, but also of the cost-benefit issue, because the calculations of costs and benefits themselves rest on individual scientific determinations of risk.²¹⁷ Finally, comprehensive discussions about risk assessment would also have helped the Court resolve whether any limiting factor for the regulation of nonthreshold pollutants should be drawn from the language of “requisite” and “adequate.”

Medical, scientific, and technical organizations and individuals were well-positioned to present information to the Court about specific risk factors, the methodology of risk assessment,²¹⁸ and the uncertainties

214. 42 U.S.C. § 7408(a)(2) (emphasis added).

215. See Gaines, *supra* note 210, at 273 (“[T]he paralysis of toxics regulation has a more complex etiology that begins with a synergy between the scientific and legal uncertainties. When the science cannot provide a conclusive description of the problem (or the proposed solution), it becomes philosophically impossible to formulate a definitive statement of the legal objective.”); Ashley C. Schannauer, *Science and Policy in Risk Assessments: The Need for Effective Public Participation*, 24 VT. L. REV. 31 (1999) (discussing uncertainties in risk assessment and their effects on environmental law and policy).

216. 42 U.S.C. § 7409(b)(1).

217. See Wagner, *supra* note 16, at 209 (discussing risk assessment as the first step in agency cost-benefit analysis); *id.* at 209 n.109 (citing Richard D. Morgenstern & Marc K. Landy, *Economic Analysis: Benefits, Costs, Implications*, in ECONOMIC ANALYSES AT EPA: ASSESSING REGULATORY IMPACT 455, 465 (Richard D. Morgenstern ed., 1997)). Professor Wagner argues that where scientific uncertainties are large, cost-benefit analyses can be useless. *Id.* Again, this demonstrates the need for presentation of information about uncertainties of the risk assessments involved in this case.

218. Cf. Brief for the Petitioners at *10 n.10, *Browner* (No. 99-1257) (“Epidemiologists look for statistical associations that may reflect cause-and-effect relationships, using the concept of statistical significance to separate those associations from results that may be the product of chance.”). An amicus brief by epidemiologists could have elaborated on this methodology to an extent that the

involved with risk assessment. Indeed, one group of lawyers and scientists²¹⁹ and one medical organization with a professional mandate²²⁰ filed amici briefs in support of the industry, while another medical organization with a political mandate filed an amicus brief in support of the EPA.²²¹ These briefs contained similar characteristics to those in other “typical” scientific amicus briefs examined in this Article.

The individual lawyers and scientists who filed an amicus brief, Gary E. Marchant et al., described themselves as “professors and scientists with scholarly or professional interests in the intersection of law and science” and expressed their “interest in seeing that the Court is informed on the appropriate use and limitations of science in setting national ambient air quality standards under the Clean Air Act.”²²² Their brief explained the problems involved with relying purely on science to set health standards. First, the lawyers and scientists argued that science is inherently unable to perform the prescriptive, rather than descriptive, functions involved with standard-setting, by providing a detailed comparison between scientific inquiry, risk assessment, and risk management.²²³ The amici then suggested that the EPA was using science as a “charade,”²²⁴ because “science alone cannot provide a consistent and principled basis for [EPA’s] standard setting.” Finally, they concluded that, because science is unable to perform the prescriptive task alone, the EPA should use other criteria such as acceptable risks, costs, risk-risk tradeoffs, and equity to set the pollutant standards.²²⁵ It is interesting to note that amici participation in this case is strikingly similar to amici participation in *Daubert*, where amici questioned the use of science as the sole principle for decision making.²²⁶

parties themselves could not, due to inadequate expertise and space limitations.

219. See Brief for Gary E. Marchant et al., *Browner* (No. 99-1426).

220. See Brief for American of American Physicians and Surgeons, *Browner* (No. 99-1426).

221. See Brief for Environmental Defense et al., *Browner* (No. 99-1426). One of the groups joining Environmental Defense on this brief was Physicians for Social Responsibility.

222. Brief for Gary E. Marchant et al., at *1, *Browner* (No. 99-1426).

223. See *id.* at *5.

224. *Id.* at *8-10. Marchant et al. draw the term “charade” from Professor Wagner’s article, *The Science Charade in Toxic Risk Regulation*, in which she argues that “agencies exaggerate the contributions made by science in setting [environmental] standards in order to avoid accountability for underlying policy decisions.” See Brief for Marchant et al., at *9, *Browner* (No. 99-1426) (citing Wagner, *supra* note 16, at 1617).

225. See *id.* at 15-18.

226. There is irony in this situation because the scientific arguments in support of a particular side are reversed from those in *Daubert*. While in *Daubert*, amici who supported reliance on peer-reviewed studies were on the side of business interests, here, amici who critique the use of peer-reviewed studies are in support of business interests. See Brief for Marchant et al., at *10-15, *Browner* (No. 99-1426).

A medical organization with a professional mandate also filed an amicus brief in *American Trucking*.²²⁷ This organization, the American Association of Physicians and Surgeons, is “dedicated to defending the practice of private medicine.”²²⁸ It devoted most of its brief to discussing the history of the nondelegation doctrine,²²⁹ thus failing to take advantage of its medical expertise. Although it asserted that “scientific guidance does not provide policy guidance,” it did not base this assertion on any discussion of scientific methodology.²³⁰ It did, however, demonstrate the independence of its position from that of the industry by voicing its disagreement with the use of a cost-benefit analysis as an intelligible principle.²³¹ The use of economic factors would, it argued, “expand[] the range of values factoring into EPA’s final decision,” rather than “guid[e] the balancing of those values.”²³²

Physicians for Social Responsibility, another medical organization with a political mandate,²³³ joined with fifteen environmental and public health organizations to file an amicus brief in support of the EPA.²³⁴ The brief presented mostly legal, rather than medical, arguments, much like many other briefs in which a medical amici joined with several nonscientific amici.²³⁵ As with the American Association of Physicians and Surgeons, the Physicians for Social Responsibility failed to take advantage of its medical expertise, and in joining with so many other organizations, may even have lost its distinctive viewpoint in the shuffle.²³⁶

The failure of the Physicians for Social Responsibility to present scientific and medical arguments in support of the EPA does not mean that no scientific arguments are available in defense of the EPA standards. Indeed, many scientific arguments were presented by both nonscientific amici as well as the parties themselves.²³⁷ Consequently, by failing to

227. See Brief for American of American Physicians and Surgeons, *Browner* (No. 99-1426).

228. *Id.* at *1.

229. See *id.* at *3-17.

230. See *id.* at *19-21.

231. See *id.* at *25-27.

232. *Id.* at *26.

233. See Physicians for Social Responsibility, *About Physicians for Social Responsibility*, at <http://www.psr.org/aboutpsr.htm> (last visited Nov. 19, 2000) (stating that the Physicians for Social Responsibility are a group of physicians working to create a world free of nuclear weapons, global environmental pollution, and gun violence).

234. See Brief for Environmental Defense, et al., *Browner* (No. 99-1426).

235. See Email Interview with John Echeverria, *supra* note 130.

236. See Brief for Environmental Defense et al., at *3-30, *Browner* (No. 99-1426) (discussing the congressional history of the Clean Air Act and rebutting the industry’s arguments for applying cost-benefit analysis to standard setting).

237. See, e.g., Brief for American Lung Association at *1-12, *Browner* (No. 99-1257) (discussing

participate individually as amici, scientific and medical organizations and individuals who supported the EPA in this dispute lost a valuable opportunity to present this information from their own unique perspectives by taking advantage of their own expertise and credibility. Amici in support of the EPA standards could have explained the epidemiological studies upon which the EPA standards were based. Additionally, scientific and medical amici could have devoted their briefs to scientific arguments supporting the foundation of such standards on peer-reviewed studies. They could also have defended the soundness of relying on risk assessment to determine the “adequacy” of health protection. Moreover, they could have used the presentation of such information to argue that the EPA was indeed applying limiting factors to its standard-setting determinations for ozone and particulate matter. This information would have provided the Court with a fuller picture of the scientific issues at stake in this case.

d. Incentives for Medical and Scientific Amici Participation

As with *Daubert*,²³⁸ *Joiner*,²³⁹ and *Kumho Tire Co.*,²⁴⁰ medical and scientific organizations had strong incentives to participate as amici in *American Trucking*. Because the circuit court could be seen as rejecting peer-reviewed science as irrelevant to its determination,²⁴¹ a reversal of its decision by the Supreme Court could be seen as a vindication of the scientific and professional value of peer review in standard-setting.²⁴² Further, because many scientists and epidemiologists work in areas that involve agency risk assessment, either as government-funded researchers or as outside consultants, the scientific and medical communities as a whole are quite

the negative health effects of ozone and particulate matter and the studies relied upon by the EPA to establish its standards); Brief for California et al. at *23-24, *Browner* (No. 99-1257) (discussing the extensive scientific credentials of the members of CASAC and noting how Congress expressed no intent that any of those members be trained in economics); Brief for California et al., *supra*, at *25-31 (discussing how cost-benefit analyses are as tied to science as risk assessments because costs decrease as scientific advances in technologies are made); Brief for the Federal Respondents at *8-12, *Browner* (No. 99-1257) (discussing the clinical studies considered by the EPA when making its determination to revise the particulate matter and ozone standards). *Cf.* Brief for the Cross-Petitioners, at *9-15, *Browner* (No. 99-1257) (critiquing the EPA’s scientific methodology in setting the revised ozone and PM standards).

238. 509 U.S. 579 (1993).

239. 522 U.S. 136 (1997).

240. 526 U.S. 137 (1999).

241. *American Trucking*, 175 F.3d at 1036.

242. *Cf.* 175 F.3d at 1059 (Tatel, J., dissenting) (citing *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993), to support his statement that “CASAC provides an objective justification for the pollution standards the Agency selects”).

familiar with the issues presented in this case. Finally, because the case involves risk assessment—an area of science familiar to attorneys specializing in areas ranging from tort law to environmental law to public health law—medical and scientific organizations interested in amici participation would not have found it difficult to locate attorneys who could present their perspectives before the Court. Indeed, what is surprising is that even more scientific and medical organizations and individuals did not participate as amici in *American Trucking*. Perhaps, as suggested earlier in this Article, these organizations believe that scientific and medical information is being adequately presented to the Court by the parties already involved.²⁴³ But even when such information has been presented by nonscientific parties, as in *American Trucking*, the Court may not take notice of this information unless discussed by scientific and medical entities that do not purport to have political mandates. Consequently, these entities may have lost a valuable opportunity to advise the Court about scientific issues by failing to participate more extensively in this case.

VI. CONCLUSION

All in all, there may be no hard and fast rules for predicting when medical, scientific, or technical organizations will participate as amici in Supreme Court cases, nor any strict normative rules for advising when such amici should participate. However, there appear to be two distinct trends in participation: the predominance of medical amici over scientific amici and the lack of medical and scientific amici in environmental cases. Notably, many environmental cases have characteristics similar to those in which medical organizations and individuals and even scientific and technical organizations and individuals have participated as amici. The presence of medical, scientific, and technical amici in environmental cases would be a welcome addition in aiding the Court to contextualize its legal decisions within the framework of environmental effects. In *American Trucking*, the presence of such amici may assist the Court in discerning intelligible principles from the EPA's standard-setting procedures. More importantly, it may help remind the Court that the implications of its decision will stretch beyond the nondelegation doctrine and affect human health and the environment, thereby highlighting what is “environmental about environmental law.”²⁴⁴

243. See discussion *supra* Part V.A.1.

244. Lazarus, *supra* note 96, at 703.