IN THE SUPREME COURT OF FLORIDA

ROBERT JAMES BRIM,	:
Petitioner,	:
vs.	:
STATE OF FLORIDA,	:
Respondent.	:
	:

SID J. WHITE AUG 21 1995 CLERK, SUPBEME COURT By **Ohler Deputy Clerk**

FILED

Case No. 85,596

DISCRETIONARY REVIEW OF DECISION OF THE DISTRICT COURT OF APPEAL OF FLORIDA SECOND DISTRICT

REPLY BRIEF OF PETITIONER ON THE MERITS

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ARGUMENT

ISSUE

WHETHER FRYE V. UNITED STATES, 293 F. 1013 (D.C. Cir. 1923), APPLIES TO THE STATISTICAL PRONG OF DNA EVI-DENCE?

In addition to relying on the arguments and authorities presented in his Initial Brief on the Merits, Mr. Brim responds to the State's Brief on the Merits as follows:

The science of population genetics, which involves the application of data bases and theoretical statistical frequencies to a perceived "match," is possibly the most critical step in determining the reliability/admissibility of DNA profiling evidence. See Judith A. McKenna, Joe S. Cecil, & Pamela Coukos, Reference Guide on Forensic DNA Evidence (VI. Comparison of DNA Profiles and VII. Estimation of the Probability That the DNA Profiles Match by Coincidence), in Reference Manual on Scientific Evidence 295-309 (Federal Judicial Center 1994). "One of the most difficult and contentious issues in forensic use of DNA evidence is how to estimate the probability that two DNA profiles match by chance." Id. at 300.

The <u>Reference Guide on Forensic DNA Evidence</u> gives an overview of the product rule and the NRC-recommended modified ceiling principle technique. <u>Id.</u>, at 300-302. Concern over accuracy of estimates of a coincidental match has focused attention on the assumptions used in selecting a comparison population and the

scientific validity of the methods used to estimate the probability of a coincidental match. <u>Id.</u> at 303.

The application of population genetics to DNA markers is perhaps the most critical step for understanding the significance of a profile match and is far from universally accepted. Especially in the forensic setting, the debate focuses on the adequacy of the population data on which frequency estimates are based and the role of racial and ethnic origin in frequency estimates. Variations in the statistical calculation method employed can yield disturbingly disparate numerical probabilities. M. Gur-Arie, <u>New</u> <u>York's DNA Data Bank and Commission on Forensic Science</u>, § 3[4] (Matthew Bender & Co., Inc., special ed. November 1994) (hereinafter <u>DNA Data Bank</u>), <u>citing</u> National Research Council, <u>DNA Technolo-</u> <u>gy in Forensic Science</u> 75 (National Academy Press 1992).

The <u>DNA Data Bank</u> report discusses the majority and concurring opinions in <u>People v. Wesley</u>, 83 N.Y.2d 417, 633 N.E.2d 451 (N.Y. 1994), and New York's 1994 statutory enactment of Chapter 737, which establishes a commission on forensic science and a state DNA identification index. The report also stresses the critical importance in applying population genetics/statistical frequencies to DNA:

(3) The Significance of a DNA 'Match'

The complexity of the scientific methods and statistical analysis employed during DNA profiling has resulted in widely held misconceptions about the information that DNA test results actually reveal. In its current stage of development, DNA typing is neither infallible nor the equivalent of 'fingerprinting' in its alleged ability to identify crime suspects

with complete accuracy. When a forensic expert declares that a DNA match exists, the expert is not stating that the defendant is the source of the biological specimen tested. The expert is not even describing the probability that the defendant is the source of this specimen. This is a critical and commonly misunderstood point.

Rather, the match of DNA profiles is interpreted with reference to population genetics, and the resulting conclusion is an estimate of the frequency with which this particular pattern of fragment lengths is likely to occur in the defendant's relevant Said another way, the ethnic population. population statistics describe the probability of a coincidental match between two unrelated individuals. Though the accused cannot be excluded as a possible source of the biological specimen, a match, it must be emphasized, does not unequivocally establish that the defendant is the source. [footnote]

[footnote] The probability statistic that accompanies a reported match between samples is 'the theoretical likelihood that a randomly selected person from the general population (or from the population of certain large ethnic or racial groups) would genetically match the trace evidence as well as the defendant.' Jonathan J. Koehler, <u>DNA Matches and Statistics: Important Questions, Surprising</u> <u>Answers</u>, 76 Judicature 222, 224 (1993).

DNA Data Bank, § 3[2], § 3[3].

The state asserts that concerns regarding general acceptance of population genetics and population statistical frequencies in DNA cases are <u>now</u> (not at the time of Mr. Brim's case) alleviated, so the issue before the court is just academic. (State's brief, p.4, 7, 9-11) Such is not the case. When the National Research Council of the National Academy of Sciences published its report, <u>DNA Technology in Forensic Science</u> (National Academy Press 1992) (hereinafter <u>NRC Report</u>), it explained four assumptions relating to application of the <u>Frye</u> test. Included in the assumptions was concern that statistical databanks used to calculate DNA match probabilities and the use of modes to combine probabilities were the subject of serious question. While the report explained that DNA evidence should not be barred on this basis, it recommended that the probability statistics of a match should be conservative. <u>NRC Report</u>, at 133-134; <u>see also NRC Report</u> at 74-75, 76, 78, 82-85, 91-93, 95; <u>Hayes v. State</u>, 20 Fla. L. Weekly S296, S298 (Fla. June 22, 1995).

The state asserts that the NRC made no attempt to resolve the controversy and, because of a later article in <u>Nature</u> magazine, the controversy has been laid to rest. (State's brief, p. 6, p. 10) It is doubtful this is so. The NRC is revising its 1992 report and has formed a new committee to focus on laboratory error rates and the reliability of population statistics calculations. <u>Hayes</u>, 20 Fla. L. Weekly at S 299 and n. 4; <u>DNA Data Bank</u>, § 3[5] and n. 23; <u>NAS Takes a Fresh Look at DNA Fingerprinting</u>, 265 <u>Science</u> 1163 (August 26, 1994).

The article in <u>Nature</u> merely shows that two people now concur that the NRC Report and resultant scientific debate served a salutary purpose -- stimulating research and professionalizing standards. Eric S. Lander & Bruce Budowle, <u>DNA Fingerprinting</u> <u>Dispute Laid to Rest</u>, 371 <u>Nature</u> 738 (October 27, 1994). The coauthors say the NRC-recommended ceiling principle is now the proper

approach in their minds when statistical evidence is challenged. Id. at 736, 738.¹

Notwithstanding the opinion of the two authors of the <u>Nature</u> article, the NRC-recommended ceiling principle, the small size of data bases, the lack of random sampling, and the FBI's "Worldwide Study" remain the focus of debate and controversy. <u>See</u> Jennifer R. Slimowitz & Joel E. Cohen, <u>Violations of the Ceiling Principle:</u> <u>Exact Conditions and Statistical Evidence</u>, 53 Am. J. Hum. Genet. 314 (1993); Seymour Geisser & Wesley Johnson, <u>Testing Independence</u> of Fragment Lengths within <u>VNTR Loci</u>, 53 Am. J. Hum. Genet. 1103 (1993); R.C. Lewontin, <u>Which Population?</u> 52 Am. J. Hum. Genetics 205 (1993); Laurence D. Mueller, <u>The Use of DNA Typing in Forensic</u> <u>Science</u>, 3 <u>Accountability in Research</u> 1 (1993); William C. Thompson, <u>DNA Evidence in Criminal Law: New Developments</u>, <u>Trial</u> 35 (August 1994).

The linchpin of the <u>Frye</u> test is to insure reliability. <u>Ramirez v. State</u>, 651 So. 2d 1164, 1167 (Fla. 1995). <u>Ramirez</u> holds that <u>Frye</u> applies to knife-mark comparison evidence. <u>See Ramirez</u>

¹ Co-author Lander previously defended the ceiling principle after the NRC Report came out, because the ceiling principle provided a method for meeting the legal standard for general acceptance by the scientific community. Co-author Budowle previously agreed that problems with the admissibility of DNA statistical evidence eased after the NRC Report. Geneticists Attack NRC Report as Scientifically Flawed, 259 Science 755, 756 (February 5, 1993). Other authors in the fields of epidemiology, genetics, and statistics criticized the "forensic inference" of the ceiling principle recommended by the NRC, although recognizing, "the appropriate degree of conservativeness remains the venue of legal scholars, not population geneticists or statisticians." B. Devlin, Neil Risch, & Kathryn Roeder, Statistical Evaluation of DNA Fingerprinting: A Critique of the NRC's Report, 259 Science 748, 749 (February 5, 1993).

<u>v. State</u>, 542 So. 2d 352 (Fla. 1989)(no sufficient scientific predicate that expert opinion based on casts from knife marks that defendant's knife was the only knife in the world that could have been used in murder; error not harmless).

The <u>Frye/Ramirez</u> standard places the burden on the proponent of the evidence to prove the general acceptance of both the underlying scientific principle and the testing procedures used to apply that principle to the facts of the case at hand. The <u>Frye</u> hearing must be conducted in a fair manner. 651 So. 2d at 1168. The trial judge has the "sole responsibility" to determine whether the proponent has established the <u>Frye</u> foundation by a preponderance of the evidence. 651 So. 2d at 1168. Step two, deciding whether the expert's testimony is based on a scientific principle or discovery that is sufficiently established to have gained general acceptance in the particular field in which it belongs, is "especially important." 651 So. 2d 1164. <u>See also</u>, Charles W. Ehrhardt, <u>Florida Evidence</u> §702.3 (1995 Edition).

In <u>Hayes v. State</u>, 20 Fla. L. Weekly S296, 298-299 (Fla. June 22, 1995), this Court took judicial notice that DNA test results are generally accepted as reliable in the scientific community, <u>provided</u> that the laboratory has followed accepted testing procedures that meet the <u>Frye</u> test to protect against false readings and contamination. It is Mr. Brim's position that <u>Frye</u> applies to the population frequency and statistical analysis prong

as well as to the testing prong of DNA evidence.² <u>Vargas v. State</u>, 640 So. 2d 1139 (Fla. 1st DCA 1994).

In addition to the cases cited in the Initial Brief, other recent decisions in Frye jurisdictions support Mr. Brim's contention. See State v. Vandebogart, 616 A.2d 483 (N.H. 1992), as modified on reconsideration, 652 A.2d 671, 679 (N.H. 1994)(FBI's method of determining match expressed by statistical probability must meet and did not meet Frye; error harmless in light of other overwhelming evidence); State v. Carter, 246 Neb. 953, 524 N.W.2d 763, 776, 781, 783, 785, 786 (Neb. 1994), (Frye applicable to statistical probability calculation step of DNA analysis where data was drawn from several labs and sources; admission of the statistical probability evidence more prejudicial than probative; error not harmless); State v. Buckner, 125 Wash.2d 915, 890 P.2d 460 (Wash. 1995) (En banc) (Frye applies to statistical prong; Lifecodes' calculation of one in over 19 billion "match" in Caucasian population was error because such a statistic means "unique in the population"); People v. Wilds, 37 Cal. Rptr. 2d 351, 353, 355, 356-357, n. 14, n. 17 (Cal. Ct. App. 1995)(statistical prong must meet Frye; after 6-month Frye hearing involving 17 experts, no error in admitting Cellmark's calculation of 1 in 4.5 million of African-Americans (revised downward), which trial court found met Frye;

² Although the state suggests that the ruling in Mr. Brim's case found the evidence to meet <u>Frye</u>, (State's brief, p. 3-4) such was not the case. The ruling was that the testing procedures were generally accepted, but that the <u>Frye</u> standard did not apply to the statistical prong. (#93-0863 - T890-892; #93-0860 - T146-148)

extensive other identification and physical evidence involved in the case); <u>People v. Venegas</u>, 37 Cal. Rptr. 2d 856, 863, 864-865 (Cal. Ct. App. 1995)(DNA statistical prong must meet <u>Frye</u>; no independent prosecution witness testified concerning general scientific acceptance of FBI RFLP protocols or scientific reliability of statistical analysis; RFLP analysis conducted by FBI rejected because FBI only partially performed its calculations according to NRC-recommended method; error not harmless when weakness of other evidence considered).³

The <u>Vandebogart</u> decision indicates that the interim ceiling principle has gained general acceptance, and in <u>future</u> cases trial courts can look to it as meeting <u>Frye</u>. <u>Vandebogart</u>, 652 A.2d at 678. Even if it can be said that the interim ceiling principle has gained general acceptance, then that supports Mr. Brim's contention that it was reversible error to allow the state to present population statistical frequency estimates that were not done under that principle or properly found to be reliable under another principle.

At the motion hearing in Mr. Brim's cases, the court had before it the NRC Report, legal memoranda and supporting cases, and volumes of materials and peer review articles. The court heard

³ In <u>Wilds</u>, 37 Cal. Rptr. 2d at 357 n. 17, and <u>Venegas</u>, 36 Cal. Rptr. 2d at 863 n. 9, the courts again specifically rejected the state's contention that a standard less than <u>Frye</u> should apply to DNA statistical analysis. The same was true in <u>People v. Soto</u>, 35 Cal. Rptr. 2d 846, 855 (Cal. App. 4th Dist. 1994), as argued by Mr. Brim in his Initial Brief. <u>Frye</u> is the correct standard to apply in Florida. The state's argument here that a relevancy standard should apply should be rejected.

strenuous argument that <u>Frye</u> should apply and strenuous argument on the prejudice that attached to figures that imply uniqueness in the population. Nevertheless, the court found it would not apply <u>Frye</u> and that the argument concerning data bases and population statistics would have to be made to the jury (#93-0863 - T890-892; #93-0860 - T146-148). The jury erroneously heard statistical frequencies propounded by the state's experts, based on the FBI/FDLE procedures, of one out of 1.4 billion whites and one out of 3.5 million blacks. The defense expert then testified that using NRC recommended approaches under the ceiling principle he reached an estimated frequency of one in approximately 9,000 in the black data base. The counting method resulted in a frequency of one in 960 or less.

The state's evidence was not generally accepted or reliable and was extremely prejudicial. Mr. Brim's cases involved no other evidence. He was convicted based upon unacceptable scientific/ statistical frequency evidence.

The state asserts that the cases applying <u>Frye</u> or only allowing admission of conservative statistical evidence are wrong because they reflect "the low opinion of the jury's ability to analyze the credibility of the evidence." (State's brief, p. 18) As explained by Professor Gur-Arie, if controversies about DNA testing, data bases, and population statistical issues are articulated as questions of weight and not admissibility, courts run the very serious risk of perpetuating bad science in the name of deference to jury autonomy. <u>DNA Data Bank</u>, §4[1], p. 25.

Mindful of the overwhelming impact DNA analysis can have on a jury, Judge Kaye emphasized the importance of carefully scrutinizing such scientific evidence. She quoted from the NRC Report:

> Forensic DNA analysis should be governed by the highest standards of scientific rigor in analysis and interpretation. Such high standards are appropriate for two reasons; the probative power of DNA typing can be so great that it can outweigh all other evidence in a trial; and the procedures for DNA typing are complex and judges and juries cannot properly weigh and evaluate conclusions based on differing standards of rigor.[footnote]

This quote underscores the dangers of the legal community embracing advances in forensic science before the reliability of the technology has been proven. Although DNA testing is an attractive new tool for fighting crime, the courts must look carefully before getting on the DNA bandwagon.

[footnote]83 N.Y.2d at 446, 611 N.Y.S.2d at 114, 633 N.E.2d at 468 (quoting National Research Council, DNA Technology in Forensic Science 52 (National Academy Press 1992)

DNA Data Bank, \$4[2], p. 26.

The federal cases relied upon by the state as to juror evaluation of scientific evidence as a matter of weight are not persuasive. <u>United States v. Bonds</u>, 12 F.3d 540 (6th Cir. 1993), is completely factually dissimilar. The case specifically excluded from consideration the NRC Report on appeal because it had not been published at the time of the defendant's trial. 12 F.3d at 551-553. The case involved a six-week <u>Frye</u> hearing, with the government calling six witnesses and the defense calling five witnesses. Some of the government's witnesses were clearly independent from the DNA laboratory. A first probability estimate of one in 270,000 was revised to one in 35,000. There was testimony of general acceptance in the scientific community of the analysis applied. The magistrate issued a 120-page report. 12 F.3d at 551. Numerous other descriptive and physical evidence was involved in the case. 12 F.3d at 547-548.

United States v. Jakobetz, 955 F.2d 786 (2d Cir. 1992), also did not involve a challenge to DNA evidence after the NRC Report. Jakobetz involved significant other identification evidence and physical evidence. 955 F.2d at 790. The court applied an abuse of discretion standard and a "helpfulness" test of relevancy. 955 F.2d at 796. Although the evidence was allowed in Jakobetz, even under such a relevancy test, the evidence should be excluded when the government cannot show the threshold of reliability. 955 F.2d at In Mr. Brim's case, the state did not meet the initial 800. threshold, and the trial court erred by law. Additionally, Jakobetz is specifically rejected in Vargas v. State, 640 So. 2d 1139, 1150 (Fla. 1st DCA 1994). It should also be recognized that in <u>Jakobetz</u> the matter was initially heard in 1990. United States v. Jakobetz, 747 F. Supp. 250, 262 (D.Ver. 1990).

The Florida cases relied upon by the state are similarly unpersuasive as to the test applied and juror evaluation of scientific statistical evidence. <u>Martinez v. State</u>, 549 So. 2d 694 (Fla. 5th DCA 1989), relied on the decision in <u>Andrews v. State</u>, 533 So. 2d 841 (Fla. 5th DCA 1988), <u>rev. denied</u>, 542 So. 2d 1332 (Fla. 1989). As argued in Mr. Brim's Initial Brief, <u>Andrews</u> was

implicitly overruled by Flanagan v. State, 625 So. 2d 827 (Fla. Charles W. Ehrhardt, Florida Evidence §702.3 and n. 11 1993). (1995 Edition). Martinez also was implicitly overruled by Additionally, in Martinez, as in Andrews, defense Flanagan. counsel <u>did</u> not <u>challenge</u> or provide authority that questioned the scientific acceptance or reliability of the testing. Martinez, 549 So. 2d at 697. Martinez, which involved a "match" of one out of 234 billion, was decided before the NRC Report was issued. 549 So. 2d at 694. The case also involved other evidence -- fingerprint identification. 549 So. 2d at 697. <u>Martinez</u> is specifically distinguished in Vargas, 640 So. 2d at 1143, because in Vargas, as here, an extensive challenge below was made to data bases and probability calculations.

Neither <u>Bundy v. State</u>, 455 So. 2d 330 (Fla. 1984), <u>cert.</u> <u>denied</u>, 476 U.S. 1109, 106 S. Ct. 1958, 90 L. Ed. 2d (1986)(<u>Bundy</u> <u>I</u>) (bite mark evidence), nor <u>Jent v. State</u>, 408 So. 2d 1024 (Fla. 1981)(hair analysis evidence), are applicable to this case. Neither case addresses the sciences of population genetics or statistical frequencies. <u>Bundy</u> involved actual models of teeth and computer enhanced photographs of bite marks, which the jury could see. There was no reliance by the jury on scientific statistical interpretations. 455 So. 2d at 348-349. <u>Jent</u> did not involve a challenge by motion or support by proper authority, but only involved an objection at trial, which is an insufficient challenge. 408 so. 2d at 1029. <u>See</u> Charles W. Ehrhardt, <u>Florida Evidence</u>, §

702.3 and n. 15 (1995 Edition). In both cases, there was also other evidence.

"DNA test results as evidence in criminal trials are not only new, but, as important, such results are based on technology that is still evolving and must be evaluated on a case by case basis." <u>Hayes</u>, 20 Fla. L. Weekly at S299. The continuing debate by scientists and the National Research Council's continuing concern about data bases and statistical frequencies reflect the need to have the reliability of the second prong of DNA evidence analyzed under <u>Frye/Ramirez</u>. Just as the methods used by the technician in performing the test must meet the requirements of <u>Frye</u>, the methods used in scientifically presenting to the jury evidence of a statistically arrived at match (data base and frequency) must meet the requirements of <u>Frye</u>.

Under the facts of Mr. Brim's cases, the scientific and judicial authority and expert testimony showed that the reliability of the data bases and statistical frequency calculations were not generally accepted in the scientific community.⁴ The evidence should not have been admitted. Because it was not reliable, was prejudicial, and was not harmless, Mr. Brim's cases must be reversed. <u>Frye</u>; <u>Ramirez</u>; <u>Hayes</u>; <u>Vargas</u>.

⁴ Even if a relevancy standard is held to apply to the second prong of DNA evidence, the standard was not met under the facts of Mr. Brim's case.

CERTIFICATE OF SERVICE

I certify that a copy has been mailed to Dale E. Tarpley, Suite 700/ 2002 N. Lois Ave., Tampa, FL 33607, (813) 873-4730, on this ______ day of August, 1995.

Respectfully submitted,

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