WELCOME BACK *DAUBERT*

Sanford L. Steelman, Jr.

North Carolina Superior Court
Judge's Conference
Wilmington, NC
June 21, 2012

Contents:

Key Cases:

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2011

SESSION LAW 2011-283
HOUSE BILL 542

AN ACT TO PROVIDE TORT REFORM FOR NORTH CAROLINA CITIZENS AND BUSINESSES.

The General Assembly of North Carolina enacts:

PART I. GENERAL REFORMS

SECTION 1.1. Article 4 of Chapter 8C of the General Statutes is amended by adding a new section to read:

"**Rule 414. Evidence of medical expenses.**
Evidence offered to prove past medical expenses shall be limited to evidence of the amounts actually paid to satisfy the bills that have been satisfied, regardless of the source of payment, and evidence of the amounts actually necessary to satisfy the bills that have been incurred but not yet satisfied. This rule does not impose upon any party an affirmative duty to seek a reduction in billed charges to which the party is not contractually entitled."

SECTION 1.2. G.S. 8-58.1 reads as rewritten:

"**§ 8-58.1. Injured party as witness when medical charges at issue.**

(a) Whenever an issue of hospital, medical, dental, pharmaceutical, or funeral charges arises in any civil proceeding, the injured party or his guardian, administrator, or executor is competent to give evidence regarding the amount paid or required to be paid in full satisfaction of such charges, provided that records or copies of such charges showing the amount paid or required to be paid in full satisfaction of such charges accompany such testimony.
(b) The testimony of ~~such~~ a person pursuant to subsection (a) of this section establishes a rebuttable presumption of the reasonableness of the amount paid or required to be paid in full satisfaction of the ~~charges~~.charges. However, in the event that the provider of hospital, medical, dental, pharmaceutical, or funeral services gives sworn testimony that the charge for that provider's service either was satisfied by payment of an amount less than the amount charged, or can be satisfied by payment of an amount less than the amount charged, then with respect to that provider's charge only, the presumption of the reasonableness of the amount charged is rebutted and a rebuttable presumption is established that the lesser satisfaction amount is the reasonable amount of the charges for the testifying provider's services. For the purposes of this subsection, the word "provider" shall include the agent or employee of a provider of hospital, medical,

dental, pharmaceutical, or funeral services, or a person with responsibility to pay a provider of hospital, medical, dental, pharmaceutical, or funeral services on behalf of an injured party.
(c) The fact that a provider charged for services provided to the injured person establishes a permissive presumption that the services provided were reasonably necessary but no presumption is established that the services provided were necessary because of injuries caused by the acts or omissions of an alleged tortfeasor."

SECTION 1.3. G.S. 8C-702(a) reads as rewritten:

"(a) If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an ~~opinion.~~opinion, or otherwise, if all of the following apply:
(1) The testimony is based upon sufficient facts or data.
(2) The testimony is the product of reliable principles and methods.
(3) The witness has applied the principles and methods reliably to the facts of the case."

PART III. OTHER REFORMS

SECTION 3.1. G.S. 6-21.1 reads as rewritten:

"**§ 6-21.1. Allowance of counsel fees as part of costs in certain cases.**
(a) In any personal injury or property damage suit, or suit against an insurance company under a policy issued by the defendant insurance company ~~and~~ in which the insured or beneficiary is the plaintiff, instituted in a court of record, upon a ~~finding~~findings by the court (i) that there was an unwarranted refusal by the defendant ~~insurance company~~ to negotiate or pay the claim which constitutes the basis of such suit, ~~instituted in a court of record, where~~ (ii) ~~that the judgment for recovery of~~amount of damages recovered is ~~ten thousand dollars ($10,000)~~twenty thousand dollars ($20,000) or less, and (iii) that the amount of damages recovered exceeded the highest offer made by the defendant no later than 90 days before the commencement of trial, the presiding judge may, in ~~his~~the judge's discretion, allow a reasonable ~~attorney fee~~ attorneys' fees to the duly licensed ~~attorney~~ attorneys representing the litigant obtaining a judgment for damages in said suit, said attorney's fee attorneys' fees to be taxed as a part of the court costs. The attorneys' fees so awarded shall not exceed ten thousand dollars ($10,000).
(b) When the presiding judge determines that an award of attorneys' fees is to be made under this statute, the judge shall issue a written order including findings of fact detailing the factual basis for the finding of an unwarranted refusal to negotiate or pay the claim, and setting forth the amount of the highest offer made 90 days or more before the commencement of trial, and the amount of damages recovered, as well as the factual basis and amount of any such attorneys' fees to be awarded."

SECTION 3.2. The General Statutes are amended by adding a new Chapter to read:

"**Chapter 38B.**
"**Trespasser Responsibility.**

"**§ 38B-1. Title.**
This Chapter may be cited as the Trespasser Responsibility Act.
"**§ 38B-2. General rule.**
A possessor of land, including an owner, lessee, or other occupant, does not owe a duty of care to a trespasser and is not subject to liability for any injury to a trespasser.
"**§ 38B-3. Exceptions.**
Notwithstanding G.S. 38B-2, a possessor of land may be subject to liability for physical injury or death to a trespasser in the following situations:
(1) Intentional harms. – A possessor may be subject to liability if the trespasser's bodily injury or death resulted from the possessor's willful or wanton conduct, or was intentionally caused by the possessor, except that a possessor may use reasonable force to repel a trespasser who has entered the land or a building with the intent to commit a crime.
(2) Harms to trespassing children caused by artificial condition. – A possessor may be subject to liability for bodily injury or death to a child trespasser resulting from an artificial condition on the land if all of the following apply:
a. The possessor knew or had reason to know that children were likely to trespass at the location of the condition.
b. The condition is one the possessor knew or reasonably should have known involved an unreasonable risk of serious bodily injury or death to such children.
c. The injured child did not discover the condition or realize the risk involved in the condition or in coming within the area made dangerous by it.
d. The utility to the possessor of maintaining the condition and the burden of eliminating the danger were slight as compared with the risk to the child involved.
e. The possessor failed to exercise reasonable care to eliminate the danger or otherwise protect the injured child.
(3) Position of peril. – A possessor may be subject to liability for physical injury or death to a trespasser if the possessor discovered the trespasser in a position of peril or helplessness on the property and failed to exercise ordinary care not to injure the trespasser.

"**§ 38B-4. Definitions.**
The following definitions shall apply in this Chapter:
(1) Child trespasser. – A trespasser who is less than 14 years of age or who has the level of mental development found in a person less than 14 years of age.
(2) Possessor. – A person in lawful possession of land, including an owner, lessee, or other occupant, or a person acting on behalf of such a lawful possessor of land.
(3) Trespasser. – A person who enters on the property of another without permission and without an invitation, express or implied."

PART IV. MISCELLANEOUS PROVISIONS

SECTION 4.1. Severability. – If any provision of this act or its application to any person or circumstance is held invalid, the remainder of this act or the application of the provision to other persons or circumstances is not affected.

SECTION 4.1.(a) If Senate Bill 33 of the 2011 Regular Session of the General Assembly becomes law, then G.S. 90-21.12(b), as enacted by Section 6 of Senate Bill 33, reads as rewritten:

"(b) In any medical malpractice action arising out of the furnishing or the failure to furnish professional services in the treatment of an emergency medical condition, as the term "emergency medical condition" is defined in ~~42 U.S.C. 1395dd(e)(1),~~42 U.S.C. § 1395dd(e)(1)(A), the claimant must prove a violation of the standards of practice set forth in subsection (a) of this section by clear and convincing evidence."

SECTION 4.2. Section 4.1(a) of this act is effective when it becomes law. Section 3.2 of this act becomes effective October 1, 2011, and applies to causes of actions arising on or after that date. The remainder of this act becomes effective October 1, 2011, and applies to actions commenced on or after that date.

In the General Assembly read three times and ratified this the 17th day of June, 2011.

s/ Walter H. Dalton
President of the Senate

s/ Thom Tillis
Speaker of the House of Representatives

s/ Beverly E. Perdue
Governor

Approved 4:20 p.m. this 24th day of June, 2011

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2011

SESSION LAW 2011-400
SENATE BILL 33

AN ACT TO REFORM THE LAWS RELATING TO MONEY JUDGMENT APPEAL BONDS, BIFURCATION OF TRIALS IN CIVIL CASES, AND MEDICAL LIABILITY.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 1-289 reads as rewritten:

"**§ 1-289. Undertaking to stay execution on money judgment.**

(a) If the appeal is from a judgment directing the payment of money, it does not stay the execution of the judgment unless a written undertaking is executed on the part of the appellant, by one or more sureties, as set forth in this section.

(b) In an action where the judgment directs the payment of money, the court shall specify the amount of the undertaking required to stay execution of the judgment pending appeal as provided in subsection (c) of this section. The undertaking shall be to the effect that if the judgment appealed from, or any part thereof, is affirmed, or the appeal is dismissed, the appellant will pay the amount directed to be paid by the judgment, or the part of such amount as to which the judgment shall be affirmed, if affirmed only in part, and all damages which shall be awarded against the appellant upon the appeal, except as provided in subsection (b) of this section. Whenever it is satisfactorily made to appear to the court that since the execution of the undertaking the sureties have become insolvent, the court may, by rule or order, require the appellant to execute, file and serve a new undertaking, as above. In case of neglect to execute such undertaking within twenty days after the service of a copy of the rule or order requiring it, the appeal may, on motion to the court, be dismissed with costs. Whenever it is necessary for a party to an action or proceeding to give a bond or an undertaking with surety or sureties, he may, in lieu thereof, deposit with the officer into court money to the amount of the bond or undertaking to be given. The court in which the action or proceeding is pending may direct what disposition shall be made of such money pending the action or proceeding. In a case where, by this section, the money is to be deposited with an officer, a judge of the court, upon the application of either party, may, at any time before the deposit is made, order the money deposited in court instead of with the officer; and a deposit made pursuant to such order is of the same effect as if made with the officer. The perfecting of an appeal by giving the undertaking mentioned in this section stays proceedings in the court below upon the judgment appealed from; except when the sale of perishable property is directed, the court below may order the property to be sold and the proceeds thereof to be deposited or invested, to abide the judgment of the appellate court.

(c) The amount of the undertaking that shall be required by the court shall be an amount determined by the court after notice and hearing proper and reasonable for the security of the rights of the adverse party, considering relevant factors, including the following:

(1) The amount of the judgment.
(2) The amount of the limits of all applicable liability policies of the appellant judgment debtor.
(3) The aggregate net worth of the appellant judgment debtor.

~~(b)~~(d) If the appellee in a civil action brought under any legal theory obtains a judgment directing the payment or expenditure of money in the amount of twenty five million dollars ($25,000,000) or more, and the appellant seeks a stay of execution of the judgment within the period of time during which the appellant has the right to pursue appellate review, including discretionary review and certiorari, the amount of the undertaking that the appellant is required to execute to stay execution of the judgment during the entire period of the appeal shall be twenty five million dollars ($25,000,000).

~~(c)~~(e) If the appellee proves by a preponderance of the evidence that the appellant for whom the undertaking has been limited under subsection ~~(b)~~(d) of this section is, for the purpose of evading the judgment, (i) dissipating its assets, (ii) secreting its assets, or (iii) diverting its assets outside the jurisdiction of the courts of North Carolina or the federal courts of the United States other than in the ordinary course of business, then the limitation in subsection ~~(b)~~(d) of this section shall not apply and the appellant shall be required to make an undertaking in the full amount otherwise required by this section."

SECTION 2. G.S. 1A-1, Rule 42(b), is amended by adding a new subdivision to read:

"(b) Separate trials. –
(1) The court may in furtherance of convenience or to avoid prejudice and shall for considerations of venue upon timely motion order a separate trial of any claim, cross-claim, counterclaim, or third-party claim, or of any separate issue or of any number of claims, cross-claims, counterclaims, third-party claims, or issues.
(2) Upon motion of any party in an action that includes a claim commenced under Article 1G of Chapter 90 of the General Statutes involving a managed care entity as defined in G.S. 90-21.50, the court shall order separate discovery and a separate trial of any claim, cross-claim, counterclaim, or third-party claim against a physician or other medical provider.
(3) Upon motion of any party in an action in tort wherein the plaintiff seeks damages exceeding one hundred fifty thousand dollars ($150,000), the court shall order separate trials for the issue of liability and the issue of damages, unless the court for good cause shown orders a single trial. Evidence relating solely to compensatory damages shall not be admissible until the trier of fact has determined that the defendant is liable. The same trier of fact that tries the issues relating to liability shall try the issues relating to damages."

SECTION 3. G.S. 1A-1, Rule 9(j), reads as rewritten:

"(j) Medical malpractice. – Any complaint alleging medical malpractice by a health care provider ~~as defined in~~ pursuant to ~~G.S. 90-21.11~~G.S. 90-21.11(2)a. in failing to comply with the applicable standard of care under G.S. 90-21.12 shall be dismissed unless:
(1) The pleading specifically asserts that the medical care ~~has~~ and all medical records pertaining to the alleged negligence that are available to the plaintiff after

reasonable inquiry have been reviewed by a person who is reasonably expected to qualify as an expert witness under Rule 702 of the Rules of Evidence and who is willing to testify that the medical care did not comply with the applicable standard of care;

(2) The pleading specifically asserts that the medical care ~~has~~ and all medical records pertaining to the alleged negligence that are available to the plaintiff after reasonable inquiry have been reviewed by a person that the complainant will seek to have qualified as an expert witness by motion under Rule 702(e) of the Rules of Evidence and who is willing to testify that the medical care did not comply with the applicable standard of care, and the motion is filed with the complaint; or

(3) The pleading alleges facts establishing negligence under the existing common-law doctrine of res ipsa loquitur.

Upon motion by the complainant prior to the expiration of the applicable statute of limitations, a resident judge of the superior court for a judicial district in which venue for the cause of action is appropriate under G.S. 1-82 or, if no resident judge for that judicial district is physically present in that judicial district, otherwise available, or able or willing to consider the motion, then any presiding judge of the superior court for that judicial district may allow a motion to extend the statute of limitations for a period not to exceed 120 days to file a complaint in a medical malpractice action in order to comply with this Rule, upon a determination that good cause exists for the granting of the motion and that the ends of justice would be served by an extension. The plaintiff shall provide, at the request of the defendant, proof of compliance with this subsection through up to ten written interrogatories, the answers to which shall be verified by the expert required under this subsection. These interrogatories do not count against the interrogatory limit under Rule 33."

SECTION 4. G.S. 8C-702(h) reads as rewritten:

"(h) Notwithstanding subsection (b) of this section, in a medical malpractice action as defined in G.S. 90-21.11(2)b. against a hospital, or other health care or medical facility, a person ~~may~~ shall not give expert testimony on the appropriate standard of care as to administrative or other nonclinical issues ~~if~~ unless the person has substantial knowledge, by virtue of his or her training and experience, about the standard of care among hospitals, or health care or medical facilities, of the same type as the hospital, or health care or medical facility, whose actions or inactions are the subject of the testimony situated in the same or similar communities at the time of the alleged act giving rise to the cause of action."

SECTION 5. G.S. 90-21.11 reads as rewritten:

"**§ 90-21.11. Definitions.**

~~As used~~The following definitions apply in this ~~Article,~~Article:

(1~~) the term "health care provider" means~~Health care provider. – ~~without limitation~~Without limitation, any of the following:

a. ~~any~~ A person who pursuant to the provisions of Chapter 90 of the General Statutes is licensed, or is otherwise registered or certified to engage in the practice of or otherwise performs duties associated with any of the following: medicine, surgery, dentistry, pharmacy, optometry,

midwifery, osteopathy, podiatry, chiropractic, radiology, nursing, physiotherapy, pathology, anesthesiology, anesthesia, laboratory analysis, rendering assistance to a physician, dental hygiene~~, psychiatry, psychology;~~psychiatry, or psychology.

b. ~~or a~~A ~~hospital or~~hospital, a nursing ~~home;~~home licensed under Chapter 131E of the General Statutes, or an adult care home licensed under Chapter 131D of the General Statutes.

c. ~~or any~~Any other person who is legally responsible for the negligence of ~~such person, hospital or nursing home;~~a person described by sub-subdivision a. of this subdivision, a hospital, a nursing home licensed under Chapter 131E of the General Statutes, or an adult care home licensed under Chapter 131D of the General Statutes.

d. ~~or any~~Any other person acting at the direction or under the supervision of ~~any of the foregoing persons,~~ a person described by sub-subdivision a. of this subdivision, a hospital, ~~or~~ a nursing ~~home.~~home licensed under Chapter 131E of the General Statutes, or an adult care home licensed under Chapter 131D of the General Statutes.

(2) ~~As used in this Article, the term "medical malpractice action" means~~ Medical malpractice action. – Either of the following:

a. ~~a~~A civil action for damages for personal injury or death arising out of the furnishing or failure to furnish professional services in the performance of medical, dental, or other health care by a health care provider.

b. A civil action against a hospital, a nursing home licensed under Chapter 131E of the General Statutes, or an adult care home licensed under Chapter 131D of the General Statutes for damages for personal injury or death, when the civil action (i) alleges a breach of administrative or corporate duties to the patient, including, but not limited to, allegations of negligent credentialing or negligent monitoring and supervision and (ii) arises from the same facts or circumstances as a claim under sub-subdivision a. of this subdivision."

SECTION 6. G.S. 90-21.12 reads as rewritten:

"**§ 90-21.12. Standard of health care.**

(a) Except as provided in subsection (b) of this section, in~~In~~ any medical malpractice action as defined in G.S. 90-21.11(2)(a), ~~action for damages for personal injury or death arising out of the furnishing or the failure to furnish professional services in the performance of medical, dental, or other health care,~~ the defendant health care provider shall not be liable for the payment of damages unless the trier of ~~the facts~~fact ~~is satisfied~~finds by the greater weight of the evidence that the care of such health care provider was not in accordance with the standards of practice among members of the same health care profession with similar training and experience situated in the same or similar communities under the same or similar circumstances at the time of the alleged act giving rise to the cause of action; or in the case of a medical malpractice action as defined in G.S. 90-21.11(2)(b), the defendant health care provider shall not be liable for the

payment of damages unless the trier of fact finds by the greater weight of the evidence that the action or inaction of such health care provider was not in accordance with the standards of practice among similar health care providers situated in the same or similar communities under the same or similar circumstances at the time of the alleged act giving rise to the cause of action.

(b) In any medical malpractice action arising out of the furnishing or the failure to furnish professional services in the treatment of an emergency medical condition, as the term "emergency medical condition" is defined in 42 U.S.C. 1395dd(e)(1), the claimant must prove a violation of the standards of practice set forth in subsection (a) of this section by clear and convincing evidence."

SECTION 7. Article 1B of Chapter 90 of the General Statutes is amended by adding the following new section to read:

"**§ 90-21.19. Liability limit for noneconomic damages.**

(a) Except as otherwise provided in subsection (b) of this section, in any medical malpractice action in which the plaintiff is entitled to an award of noneconomic damages, the total amount of noneconomic damages for which judgment is entered against all defendants shall not exceed five hundred thousand dollars ($500,000). Judgment shall not be entered against any defendant for noneconomic damages in excess of five hundred thousand dollars ($500,000) for all claims brought by all parties arising out of the same professional services. On January 1 of every third year, beginning with January 1, 2014, the Administrative Office of the Courts shall reset the limitation on damages for noneconomic loss set forth in this subsection to be equal to five hundred thousand dollars ($500,000) times the ratio of the Consumer Price Index for November of the prior year to the Consumer Price Index for November 2011. The Administrative Office of the Courts shall inform the Revisor of Statutes of the reset limitation. The Revisor of Statutes shall publish this reset limitation as an editor's note to this section. In the event that any verdict or award of noneconomic damages stated pursuant to G.S. 90-21.19B exceeds these limits, the court shall modify the judgment as necessary to conform to the requirements of this subsection.

(b) Notwithstanding subsection (a) of this section, there shall be no limit on the amount of noneconomic damages for which judgment may be entered against a defendant if the trier of fact finds both of the following:

(1) The plaintiff suffered disfigurement, loss of use of part of the body, permanent injury or death.

(2) The defendant's acts or failures, which are the proximate cause of the plaintiff's injuries, were committed in reckless disregard of the rights of others, grossly negligent, fraudulent, intentional or with malice.

(c) The following definitions apply in this section:

(1) Consumer Price Index. – The Consumer Price Index – All Urban Consumers, for the South urban area, as published by the Bureau of Labor Statistics of the United States Department of Labor.

(2) Noneconomic damages. – Damages to compensate for pain, suffering, emotional distress, loss of consortium, inconvenience, and any other nonpecuniary compensatory damage. "Noneconomic damages" does not include punitive damages as defined in G.S. 1D-5.

(3) Same professional services. – The transactions, occurrences, or series of transactions or occurrences alleged to have caused injury to the health care provider's patient.

(d) Any award of damages in a medical malpractice action shall be stated in accordance with G.S. 90-21.19B. If a jury is determining the facts, the court shall not instruct the jury with respect to the limit of noneconomic damages under subsection (a) of this section, and neither the attorney for any party nor a witness shall inform the jury or potential members of the jury panel of that limit."

SECTION 8. Article 1B of Chapter 90 of the General Statutes is amended by adding the following new section to read:

"**§ 90-21.19B. Verdicts and awards of damages in medical malpractice actions; form.** In any malpractice action, any verdict or award of damages, if supported by the evidence, shall indicate specifically what amount, if any, is awarded for noneconomic damages. If applicable, the court shall instruct the jury on the definition of noneconomic damages under G.S. 90-21.19(b)."

SECTION 9. G.S. 1-17 reads as rewritten:

"**§ 1-17. Disabilities.**

(a) A person entitled to commence an action who is under a disability at the time the cause of action accrued may bring his or her action within the time limited in this Subchapter, after the disability is removed, except in an action for the recovery of real property, or to make an entry or defense founded on the title to real property, or to rents and services out of the real property, when the person must commence his or her action, or make the entry, within three years next after the removal of the disability, and at no time thereafter.

For the purpose of this section, a person is under a disability if the person meets one or more of the following conditions:

(1) The person is within the age of 18 years.

(2) The person is insane.

(3) The person is incompetent as defined in G.S. 35A-1101(7) or (8).

(a1) For those persons under a disability on January 1, 1976, as a result of being imprisoned on a criminal charge, or in execution under sentence for a criminal offense, the statute of limitations shall commence to run and no longer be tolled from January 1, 1976.

(b) Notwithstanding the provisions of subsection (a) of this section, and except as otherwise provided in subsection (c) of this section, an action on behalf of a minor for malpractice arising out of the performance of or failure to perform professional services shall be commenced within the limitations of time specified in G.S. 1-15(c), except that if those time limitations expire before the minor attains the full age of 19 years, the action may be brought before the minor attains the full age of 19 years.

(c) Notwithstanding the provisions of subsection (a) and (b) of this section, an action on behalf of a minor for injuries alleged to have resulted from malpractice arising out of a health care provider's performance of or failure to perform professional services shall be commenced within the limitations of time specified in G.S. 1-15(c), except as follows:

(1) If the time limitations specified in G.S. 1-15(c) expire before the minor attains the full age of 10 years, the action may be brought any time before the minor attains the full age of 10 years.
(2) If the time limitations in G.S. 1-15(c) have expired and before a minor reaches the full age of 18 years a court has entered judgment or consent order under the provisions of Chapter 7B of the General Statutes finding that said minor is an abused or neglected juvenile as defined in G.S. 7B-101, the medical malpractice action shall be commenced within three years from the date of such judgment or consent order, or before the minor attains the full age of 10 years, whichever is later.
(3) If the time limitations in G.S. 1-15(c) have expired and a minor is in legal custody of the State, a county, or an approved child placing agency as defined in G.S. 131D-10.2, the medical malpractice action shall be commenced within one year after the minor is no longer in such legal custody, or before the minor attains the full age of 10 years, whichever is later."

S**ECTION 10.** Severability. – If the provisions of Section 7 of this act are declared to be unconstitutional or otherwise invalid by final decision of a court of competent jurisdiction, then Section 8 of this act is repealed, but the invalidity does not affect other provisions or applications of this act that can be given effect without the invalid provisions. If any other provision of this act or its application to any person or circumstance is held invalid, the remainder of this act or the application of the provision to other persons or circumstances is not affected.

SECTION 11. Sections 5, 6 and 9 of this act become effective October 1, 2011, and apply to causes of actions arising on or after that date. The remainder of this act becomes effective October 1, 2011, and applies to actions commenced on or after that date.

In the General Assembly read three times and ratified this the 13th day of June, 2011.

s/ Walter H. Dalton
President of the Senate

s/ Dale R. Folwell
Speaker Pro Tempore of the House of Representatives

VETO Beverly E. Perdue
Governor

Became law notwithstanding the objections of the Governor, 5:48 p.m. this 25th day of July, 2011.

s/ Denise Weeks
House Principal Clerk

NORTH CAROLINA RULE OF EVIDENCE 702

Rule 702. Testimony by experts.

(a) If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion, or otherwise, if all of the following apply:

(1) The testimony is based upon sufficient facts or data.

(2) The testimony is the product of reliable principles and methods.

(3) The witness has applied the principles and methods reliably to the facts of the case.

(a1) A witness, qualified under subsection (a) of this section and with proper foundation, may give expert testimony solely on the issue of impairment and not on the issue of specific alcohol concentration level relating to the following:

(1) The results of a Horizontal Gaze Nystagmus (HGN) Test when the test is administered by a person who has successfully completed training in HGN.

(2) Whether a person was under the influence of one or more impairing substances, and the category of such impairing substance or substances. A witness who has received training and holds a current certification as a Drug Recognition Expert, issued by the State Department of Health and Human Services, shall be qualified to give the testimony under this subdivision.

(b) In a medical malpractice action as defined in G.S. 90-21.11, a person shall not give expert testimony on the appropriate standard of health care as defined in G.S. 90-21.12 unless the person is a licensed health care provider in this State or another state and meets the following criteria:

(1) If the party against whom or on whose behalf the testimony is offered is a specialist, the expert witness must:

a. Specialize in the same specialty as the party against whom or on whose behalf the testimony is offered; or

b. Specialize in a similar specialty which includes within its specialty the performance of the procedure that is the subject of the complaint and have prior experience treating similar patients.

(2) During the year immediately preceding the date of the occurrence that is the basis for the action, the expert witness must have devoted a majority of his or her professional time to either or both of the following:

a. The active clinical practice of the same health profession in which the party against whom or on whose behalf the testimony is offered, and if that party is a specialist, the active clinical practice of the same specialty or a similar specialty which includes within its specialty the performance of the procedure that is the subject of the complaint and have prior experience treating similar patients; or

b. The instruction of students in an accredited health professional school or accredited residency or clinical research program in the same health profession in which the party against whom or on whose behalf the testimony is offered, and if that party is a specialist, an accredited

health professional school or accredited residency or clinical research program in the same specialty.

(c) Notwithstanding subsection (b) of this section, if the party against whom or on whose behalf the testimony is offered is a general practitioner, the expert witness, during the year immediately preceding the date of the occurrence that is the basis for the action, must have devoted a majority of his or her professional time to either or both of the following:

(1) Active clinical practice as a general practitioner; or

(2) Instruction of students in an accredited health professional school or accredited residency or clinical research program in the general practice of medicine.

(d) Notwithstanding subsection (b) of this section, a physician who qualifies as an expert under subsection (a) of this Rule and who by reason of active clinical practice or instruction of students has knowledge of the applicable standard of care for nurses, nurse practitioners, certified registered nurse anesthetists, certified registered nurse midwives, physician assistants, or other medical support staff may give expert testimony in a medical malpractice action with respect to the standard of care of which he is knowledgeable of nurses, nurse practitioners, certified registered nurse anesthetists, certified registered nurse midwives, physician assistants licensed under Chapter 90 of the General Statutes, or other medical support staff.

(e) Upon motion by either party, a resident judge of the superior court in the county or judicial district in which the action is pending may allow expert testimony on the appropriate standard of health care by a witness who does not meet the requirements of subsection (b) or (c) of this Rule, but who is otherwise qualified as an expert witness, upon a showing by the movant of extraordinary circumstances and a determination by the court that the motion should be allowed to serve the ends of justice.

(f) In an action alleging medical malpractice, an expert witness shall not testify on a contingency fee basis.

(g) This section does not limit the power of the trial court to disqualify an expert witness on grounds other than the qualifications set forth in this section.

(h) Notwithstanding subsection (b) of this section, in a medical malpractice action as defined in G.S. 90-21.11(2)b. against a hospital, or other health care or medical facility, a person shall not give expert testimony on the appropriate standard of care as to administrative or other nonclinical issues unless the person has substantial knowledge, by virtue of his or her training and experience, about the standard of care among hospitals, or health care or medical facilities, of the same type as the hospital, or health care or medical facility, whose actions or inactions are the subject of the testimony situated in the same or similar communities at the time of the alleged act giving rise to the cause of action.

(i) A witness qualified as an expert in accident reconstruction who has performed a reconstruction of a crash, or has reviewed the report of investigation, with proper foundation may give an opinion as to the speed of a vehicle even if the witness did not observe the vehicle moving. (1983, c. 701, s. 1; 1995, c. 309, s. 1; 2006-253, s. 6; 2007-493, s. 5; 2011-283, s. 1.3; 2011-400, s. 4.)

FEDERAL RULE OF EVIDENCE 702

RULE 702. TESTIMONY BY EXPERT WITNESSES

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

(a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case.

NOTES

(Pub. L. 93–595, §1, Jan. 2, 1975, 88 Stat. 1937; Apr. 17, 2000, eff. Dec. 1, 2000; Apr. 26, 2011, eff. Dec. 1, 2011.)

NOTES OF ADVISORY COMMITTEE ON PROPOSED RULES

An intelligent evaluation of facts is often difficult or impossible without the application of some scientific, technical, or other specialized knowledge. The most common source of this knowledge is the expert witness, although there are other techniques for supplying it.

Most of the literature assumes that experts testify only in the form of opinions. The assumption is logically unfounded. The rule accordingly recognizes that an expert on the stand may give a dissertation or exposition of scientific or other principles relevant to the case, leaving the trier of fact to apply them to the facts. Since much of the criticism of expert testimony has centered upon the hypothetical question, it seems wise to recognize that opinions are not indispensable and to encourage the use of expert testimony in non-opinion form when counsel believes the trier can itself draw the requisite inference. The use of opinions is not abolished by the rule, however. It will continue to be permissible for the experts to take the further step of suggesting the inference which should be drawn from applying the specialized knowledge to the facts. See Rules 703 to 705.

Whether the situation is a proper one for the use of expert testimony is to be determined on the basis of assisting the trier. "There is no more certain test for determining when experts may be used than the common sense inquiry whether the untrained layman would be qualified to determine intelligently and to the best possible degree the particular issue without enlightenment from those having a specialized understanding of the subject involved in the dispute." Ladd, Expert Testimony, 5 Vand.L.Rev. 414, 418 (1952). When opinions are excluded, it is because they are unhelpful and therefore superfluous and a waste of time. 7 Wigmore §1918.

The rule is broadly phrased. The fields of knowledge which may be drawn upon are not limited merely to the "scientific" and "technical" but extend to all "specialized" knowledge. Similarly, the expert is viewed, not in a narrow sense, but as a person qualified by "knowledge, skill, experience, training or education." Thus within the scope of the rule are not only experts in the strictest sense of the word, e.g., physicians, physicists, and architects, but also the large group sometimes called "skilled" witnesses, such as bankers or landowners testifying to land values.

COMMITTEE NOTES ON RULES—2000 AMENDMENT

Rule 702 has been amended in response to *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 509 U.S. 579 (1993), and to the many cases applying *Daubert*, including *Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167 (1999). In *Daubert* the Court charged trial judges with the responsibility of acting as gatekeepers to exclude unreliable expert testimony, and the Court in *Kumho* clarified that this gatekeeper function applies to all expert testimony, not just testimony based in science. *See also Kumho*, 119 S.Ct. at 1178 (citing the Committee Note to the proposed amendment to Rule 702, which had been released for public comment before the date of the *Kumho* decision). The amendment affirms the trial court's role as gatekeeper and provides some general standards that the trial court must use to assess the reliability and helpfulness of proffered expert testimony. Consistently with *Kumho*, the Rule as amended provides that all types of expert testimony present questions of admissibility for the trial court in deciding whether the evidence is reliable and helpful. Consequently, the admissibility of all expert testimony is governed by the principles of Rule 104(a). Under that Rule, the proponent has the burden of establishing that the pertinent admissibility requirements are met by a preponderance of the evidence. *See Bourjaily v. United States*, 483 U.S. 171 (1987).

Daubert set forth a non-exclusive checklist for trial courts to use in assessing the reliability of scientific expert testimony. The specific factors explicated by the *Daubert* Court are (1) whether the expert's technique or theory can be or has been tested—that is, whether the expert's theory can be challenged in some objective sense, or whether it is instead simply a subjective, conclusory approach that cannot reasonably be assessed for reliability; (2) whether the technique or theory has been subject to peer review and publication; (3) the known or potential rate of error of the technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) whether the technique or theory has been generally accepted in the scientific community. The Court in *Kumho* held that these factors might also be applicable in assessing the reliability of nonscientific expert testimony, depending upon "the particular circumstances of the particular case at issue." 119 S.Ct. at 1175.

No attempt has been made to "codify" these specific factors. *Daubert* itself emphasized that the factors were neither exclusive nor dispositive. Other cases have recognized that not all of the specific *Daubert* factors can apply to every type of expert testimony. In addition to *Kumho*, 119 S.Ct. at 1175, *see Tyus v. Urban Search Management*, 102 F.3d 256 (7th Cir. 1996) (noting that the factors mentioned by the Court in *Daubert* do not neatly apply to expert testimony from a sociologist). *See also Kannankeril v. Terminix Int'l, Inc.*, 128 F.3d 802, 809 (3d Cir. 1997) (holding that lack of peer review or publication was not dispositive where the expert's opinion was supported by "widely accepted scientific knowledge"). The standards set forth in the

amendment are broad enough to require consideration of any or all of the specific *Daubert* factors where appropriate.

Courts both before and after *Daubert* have found other factors relevant in determining whether expert testimony is sufficiently reliable to be considered by the trier of fact. These factors include:

(1) Whether experts are "proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying." *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 43 *F.3d* 1311, 1317 (9th Cir. 1995).

(2) Whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion. *See General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (noting that in some cases a trial court "may conclude that there is simply too great an analytical gap between the data and the opinion proffered").

(3) Whether the expert has adequately accounted for obvious alternative explanations. *See Claar v. Burlington N.R.R.*, 29 F.3d 499 (9th Cir. 1994) (testimony excluded where the expert failed to consider other obvious causes for the plaintiff's condition). *Compare Ambrosini v. Labarraque*, 101 F.3d 129 (D.C.Cir. 1996) (the possibility of some uneliminated causes presents a question of weight, so long as the most obvious causes have been considered and reasonably ruled out by the expert).

(4) Whether the expert "is being as careful as he would be in his regular professional work outside his paid litigation consulting." *Sheehan v. Daily Racing Form, Inc*., 104 F.3d 940, 942 (7th Cir. 1997). *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1176 (1999) (*Daubert* requires the trial court to assure itself that the expert "employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field").

(5) Whether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1175 (1999) (*Daubert's* general acceptance factor does not "help show that an expert's testimony is reliable where the discipline itself lacks reliability, as, for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy."); *Moore v. Ashland Chemical, Inc*., 151 F.3d 269 (5th Cir. 1998) (en banc) (clinical doctor was properly precluded from testifying to the toxicological cause of the plaintiff's respiratory problem, where the opinion was not sufficiently grounded in scientific methodology); *Sterling v. Velsicol Chem. Corp*., 855 F.2d 1188 (6th Cir. 1988) (rejecting testimony based on "clinical ecology" as unfounded and unreliable).

All of these factors remain relevant to the determination of the reliability of expert testimony under the Rule as amended. Other factors may also be relevant. *See Kumho*, 119 S.Ct. 1167, 1176 ("[W]e conclude that the trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable."). Yet no single factor is necessarily dispositive of the reliability of a particular expert's testimony.

See, e.g., Heller v. Shaw Industries, Inc., 167 F.3d 146, 155 (3d Cir. 1999) ("not only must each stage of the expert's testimony be reliable, but each stage must be evaluated practically and flexibly without bright-line exclusionary (or inclusionary) rules."); *Daubert v. Merrell Dow Pharmaceuticals, Inc*., 43 F.3d 1311, 1317, n.5 (9th Cir. 1995) (noting that some expert disciplines "have the courtroom as a principal theatre of operations" and as to these disciplines "the fact that the expert has developed an expertise principally for purposes of litigation will obviously not be a substantial consideration.").

A review of the caselaw after *Daubert* shows that the rejection of expert testimony is the exception rather than the rule. *Daubert* did not work a "seachange over federal evidence law," and "the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary system." *United States v. 14.38 Acres of Land Situated in Leflore County, Mississippi*, 80 F.3d 1074, 1078 (5th Cir. 1996). As the Court in *Daubert* stated: "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." 509 U.S. at 595. Likewise, this amendment is not intended to provide an excuse for an automatic challenge to the testimony of every expert. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1176 (1999) (noting that the trial judge has the discretion "both to avoid unnecessary 'reliability' proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert's reliability arises.").

When a trial court, applying this amendment, rules that an expert's testimony is reliable, this does not necessarily mean that contradictory expert testimony is unreliable. The amendment is broad enough to permit testimony that is the product of competing principles or methods in the same field of expertise. *See, e.g., Heller v. Shaw Industries, Inc*., 167 F.3d 146, 160 (3d Cir. 1999) (expert testimony cannot be excluded simply because the expert uses one test rather than another, when both tests are accepted in the field and both reach reliable results). As the court stated in *In re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717, 744 (3d Cir. 1994), proponents "do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable. . . . The evidentiary requirement of reliability is lower than the merits standard of correctness." *See also Daubert v. Merrell Dow Pharmaceuticals, Inc*., 43 F.3d 1311, 1318 (9th Cir. 1995) (scientific experts might be permitted to testify if they could show that the methods they used were also employed by "a recognized minority of scientists in their field."); *Ruiz-Troche v. Pepsi Cola*, 161 F.3d 77, 85 (1st Cir. 1998) (" *Daubert* neither requires nor empowers trial courts to determine which of several competing scientific theories has the best provenance.").

The Court in *Daubert* declared that the "focus, of course, must be solely on principles and methodology, not on the conclusions they generate." 509 U.S. at 595. Yet as the Court later recognized, "conclusions and methodology are not entirely distinct from one another." *General Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997). Under the amendment, as under *Daubert*, when an expert purports to apply principles and methods in accordance with professional standards, and yet reaches a conclusion that other experts in the field would not reach, the trial court may fairly suspect that the principles and methods have not been faithfully applied. *See Lust v. Merrell Dow*

Pharmaceuticals, Inc., 89 F.3d 594, 598 (9th Cir. 1996). The amendment specifically provides that the trial court must scrutinize not only the principles and methods used by the expert, but also whether those principles and methods have been properly applied to the facts of the case. As the court noted in *In re Paoli R.R. Yard PCB Litig*., 35 F.3d 717, 745 (3d Cir. 1994), " *any* step that renders the analysis unreliable . . . renders the expert's testimony inadmissible. *This is true whether the step completely changes a reliable methodology or merely misapplies that methodology*."

If the expert purports to apply principles and methods to the facts of the case, it is important that this application be conducted reliably. Yet it might also be important in some cases for an expert to educate the factfinder about general principles, without ever attempting to apply these principles to the specific facts of the case. For example, experts might instruct the factfinder on the principles of thermodynamics, or bloodclotting, or on how financial markets respond to corporate reports, without ever knowing about or trying to tie their testimony into the facts of the case. The amendment does not alter the venerable practice of using expert testimony to educate the factfinder on general principles. For this kind of generalized testimony, Rule 702 simply requires that: (1) the expert be qualified; (2) the testimony address a subject matter on which the factfinder can be assisted by an expert; (3) the testimony be reliable; and (4) the testimony "fit" the facts of the case.

As stated earlier, the amendment does not distinguish between scientific and other forms of expert testimony. The trial court's gatekeeping function applies to testimony by any expert. *See Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1171 (1999) ("We conclude that *Daubert's* general holding—setting forth the trial judge's general 'gatekeeping' obligation—applies not only to testimony based on 'scientific' knowledge, but also to testimony based on 'technical' and 'other specialized' knowledge."). While the relevant factors for determining reliability will vary from expertise to expertise, the amendment rejects the premise that an expert's testimony should be treated more permissively simply because it is outside the realm of science. An opinion from an expert who is not a scientist should receive the same degree of scrutiny for reliability as an opinion from an expert who purports to be a scientist. *See Watkins v. Telsmith, Inc*., 121 F.3d 984, 991 (5th Cir. 1997) ("[I]t seems exactly backwards that experts who purport to rely on general engineering principles and practical experience might escape screening by the district court simply by stating that their conclusions were not reached by any particular method or technique."). Some types of expert testimony will be more objectively verifiable, and subject to the expectations of falsifiability, peer review, and publication, than others. Some types of expert testimony will not rely on anything like a scientific method, and so will have to be evaluated by reference to other standard principles attendant to the particular area of expertise. The trial judge in all cases of proffered expert testimony must find that it is properly grounded, well-reasoned, and not speculative before it can be admitted. The expert's testimony must be grounded in an accepted body of learning or experience in the expert's field, and the expert must explain how the conclusion is so grounded. *See, e.g.*, American College of Trial Lawyers, *Standards and Procedures for Determining the Admissibility of Expert Testimony after Daubert*, 157 F.R.D. 571, 579 (1994) ("[W]hether the testimony concerns economic principles, accounting standards, property valuation or other non-scientific subjects, it should be evaluated by reference to the 'knowledge and experience' of that particular field.").

The amendment requires that the testimony must be the product of reliable principles and methods that are reliably applied to the facts of the case. While the terms “principles” and “methods” may convey a certain impression when applied to scientific knowledge, they remain relevant when applied to testimony based on technical or other specialized knowledge. For example, when a law enforcement agent testifies regarding the use of code words in a drug transaction, the principle used by the agent is that participants in such transactions regularly use code words to conceal the nature of their activities. The method used by the agent is the application of extensive experience to analyze the meaning of the conversations. So long as the principles and methods are reliable and applied reliably to the facts of the case, this type of testimony should be admitted.

Nothing in this amendment is intended to suggest that experience alone—or experience in conjunction with other knowledge, skill, training or education—may not provide a sufficient foundation for expert testimony. To the contrary, the text of Rule 702 expressly contemplates that an expert may be qualified on the basis of experience. In certain fields, experience is the predominant, if not sole, basis for a great deal of reliable expert testimony. *See, e.g., United States v. Jones*, 107 F.3d 1147 (6th Cir. 1997) (no abuse of discretion in admitting the testimony of a handwriting examiner who had years of practical experience and extensive training, and who explained his methodology in detail); *Tassin v. Sears Roebuck*, 946 F.Supp. 1241, 1248 (M.D.La. 1996) (design engineer's testimony can be admissible when the expert's opinions “are based on facts, a reasonable investigation, and traditional technical/mechanical expertise, and he provides a reasonable link between the information and procedures he uses and the conclusions he reaches”). *See also Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1178 (1999) (stating that “no one denies that an expert might draw a conclusion from a set of observations based on extensive and specialized experience.”).

If the witness is relying solely or primarily on experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. The trial court's gatekeeping function requires more than simply “taking the expert's word for it.” *See Daubert v. Merrell Dow Pharmaceuticals, Inc*., 43 F.3d 1311, 1319 (9th Cir. 1995) (“We've been presented with only the experts’ qualifications, their conclusions and their assurances of reliability. Under *Daubert*, that's not enough.”). The more subjective and controversial the expert's inquiry, the more likely the testimony should be excluded as unreliable. *See O'Conner v. Commonwealth Edison Co*., 13 F.3d 1090 (7th Cir. 1994) (expert testimony based on a completely subjective methodology held properly excluded). *See also Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1176 (1999) (“[I]t will at times be useful to ask even of a witness whose expertise is based purely on experience, say, a perfume tester able to distinguish among 140 odors at a sniff, whether his preparation is of a kind that others in the field would recognize as acceptable.”).

Subpart (1) of Rule 702 calls for a quantitative rather than qualitative analysis. The amendment requires that expert testimony be based on sufficient underlying “facts or data.” The term “data” is intended to encompass the reliable opinions of other experts. See the original Advisory Committee Note to Rule 703. The language “facts or data” is broad enough to allow an expert to rely on hypothetical facts that are supported by the evidence. *Id.*

When facts are in dispute, experts sometimes reach different conclusions based on competing versions of the facts. The emphasis in the amendment on "sufficient facts or data" is not intended to authorize a trial court to exclude an expert's testimony on the ground that the court believes one version of the facts and not the other.

There has been some confusion over the relationship between Rules 702 and 703. The amendment makes clear that the sufficiency of the basis of an expert's testimony is to be decided under Rule 702. Rule 702 sets forth the overarching requirement of reliability, and an analysis of the sufficiency of the expert's basis cannot be divorced from the ultimate reliability of the expert's opinion. In contrast, the "reasonable reliance" requirement of Rule 703 is a relatively narrow inquiry. When an expert relies on inadmissible information, Rule 703 requires the trial court to determine whether that information is of a type reasonably relied on by other experts in the field. If so, the expert can rely on the information in reaching an opinion. However, the question whether the expert is relying on a *sufficient* basis of information—whether admissible information or not—is governed by the requirements of Rule 702.

The amendment makes no attempt to set forth procedural requirements for exercising the trial court's gatekeeping function over expert testimony. *See* Daniel J. Capra, *The Daubert Puzzle*, 38 Ga.L.Rev. 699, 766 (1998) ("Trial courts should be allowed substantial discretion in dealing with *Daubert* questions; any attempt to codify procedures will likely give rise to unnecessary changes in practice and create difficult questions for appellate review."). Courts have shown considerable ingenuity and flexibility in considering challenges to expert testimony under *Daubert*, and it is contemplated that this will continue under the amended Rule. *See, e.g.*, *Cortes-Irizarry v. Corporacion Insular*, 111 F.3d 184 (1st Cir. 1997) (discussing the application of *Daubert* in ruling on a motion for summary judgment); *In re Paoli R.R. Yard PCB Litig*., 35 F.3d 717, 736, 739 (3d Cir. 1994) (discussing the use of *in limine* hearings); *Claar v. Burlington N.R.R.*, 29 F.3d 499, 502–05 (9th Cir. 1994) (discussing the trial court's technique of ordering experts to submit serial affidavits explaining the reasoning and methods underlying their conclusions).

The amendment continues the practice of the original Rule in referring to a qualified witness as an "expert." This was done to provide continuity and to minimize change. The use of the term "expert" in the Rule does not, however, mean that a jury should actually be informed that a qualified witness is testifying as an "expert." Indeed, there is much to be said for a practice that prohibits the use of the term "expert" by both the parties and the court at trial. Such a practice "ensures that trial courts do not inadvertently put their stamp of authority" on a witness's opinion, and protects against the jury's being "overwhelmed by the so-called 'experts'." Hon. Charles Richey, *Proposals to Eliminate the Prejudicial Effect of the Use of the Word "Expert" Under the Federal Rules of Evidence in Criminal and Civil Jury Trials*, 154 F.R.D. 537, 559 (1994) (setting forth limiting instructions and a standing order employed to prohibit the use of the term "expert" in jury trials).

GAP Report—Proposed Amendment to Rule 702. The Committee made the following changes to the published draft of the proposed amendment to Evidence Rule 702:

1. The word "reliable" was deleted from Subpart (1) of the proposed amendment, in order to avoid an overlap with Evidence Rule 703, and to clarify that an expert opinion need not be

excluded simply because it is based on hypothetical facts. The Committee Note was amended to accord with this textual change.

2. The Committee Note was amended throughout to include pertinent references to the Supreme Court's decision in *Kumho Tire Co. v. Carmichael*, which was rendered after the proposed amendment was released for public comment. Other citations were updated as well.

3. The Committee Note was revised to emphasize that the amendment is not intended to limit the right to jury trial, nor to permit a challenge to the testimony of every expert, nor to preclude the testimony of experience-based experts, nor to prohibit testimony based on competing methodologies within a field of expertise.

4. Language was added to the Committee Note to clarify that no single factor is necessarily dispositive of the reliability inquiry mandated by Evidence Rule 702.

COMMITTEE NOTES ON RULES—2011 AMENDMENT

The language of Rule 702 has been amended as part of the restyling of the Evidence Rules to make them more easily understood and to make style and terminology consistent throughout the rules. These changes are intended to be stylistic only. There is no intent to change any result in any ruling on evidence admissibility.

NORTH CAROLINA APPELLATE CASES DEALING WITH DAUBERT

Supreme Court Cases

State v. Morgan, 359 N.C. 131, 604 S.E.2d 886, (2004).

Defendant next argues that the trial court erred in qualifying State Bureau of Investigation Special Agent Mike Garrett as an expert in bloodstain pattern interpretation and in admitting his expert testimony. Defendant, relying upon *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995), and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993), contends that Agent Garrett's testimony was inherently unreliable because he lacked the requisite knowledge and credentials to permit his qualification as an expert.

Defendant filed his brief before we issued our opinion in *Howerton v. Arai Helmet, Ltd.*, 358 N.C. 440, 597 S.E.2d 674 (2004). In *Howerton*, we addressed the admissibility of expert testimony and concluded that North Carolina is not a *Daubert* state. *Id.* at 469, 597 S.E.2d at 693. This Court was concerned about the excessively mechanical application of the *Daubert* factors that seem to have evolved in the federal courts. *Id.* at 464-66, 597 S.E.2d at 690-91. We were also uneasy about the potential interpretations and applications of *Daubert* that could strip the jury of its function as the ultimate finder of fact. *Id.* at 468, 597 S.E.2d at 692. Accordingly, we reiterated that under North Carolina law, a trial court that is considering whether to admit proffered expert testimony pursuant to North Carolina Rule of Evidence 702 must conduct a three-step inquiry to determine: (1) whether the expert's proffered method of proof is reliable, (2) whether the witness presenting the evidence qualifies as an expert in that area, and (3) whether the evidence is relevant. *Id.* at 458, 597 S.E.2d at 686 (citing *Goode*, 341 N.C. at 527-29, 461 S.E.2d at 639-41). In discussing the trial court's determination of the reliability of proffered expert evidence where "the trial court is without precedential guidance or faced with novel scientific theories, unestablished techniques, or compelling new perspectives on otherwise settled theories or techniques," we set out several "indices of reliability" that the trial court could consider. *Id.* at 460, 597 S.E.2d at 687 (citing *State v. Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990)). Because we did not intend to tie the hands of the State's able trial bench, we specifically stated that these indices were not exclusive. *Id.* A trial court is "afforded 'wide latitude of discretion when making a determination about the admissibility of expert testimony.'" *Id.* at 458, 597 S.E.2d at 686 (quoting *State v. Bullard*, 312 N.C. 129, 140, 322 S.E.2d 370, 376 (1984)). Accordingly, a trial court's rulings under Rule 702 will not be reversed on appeal absent an abuse of discretion. *Id.*

Turning to the case at bar, defendant does not contend that bloodstain pattern interpretation is not a sufficiently reliable area for expert testimony, and at any rate we have recognized this discipline to be "an appropriate area for expert testimony." *Goode*, 341 N.C. at 531, 461 S.E.2d at 641. In addition, defendant does not argue that the evidence is irrelevant. Defendant's contention is that Agent Garrett was not qualified in the field of bloodstain pattern interpretation. Accordingly, we will limit our analysis to this issue.

We have held that
"it is not necessary that an expert be experienced with the identical subject matter at issue or be a specialist, licensed, or even engaged in a specific profession. It is enough that the expert witness 'because of his expertise is in a better position to have an opinion on the subject than is the trier of fact.'"
Id. at 529, 461 S.E.2d at 640 (citations omitted). The record reveals that Agent Garrett possessed sufficient knowledge, experience, and training in the field of bloodstain pattern interpretation to warrant his qualification as an expert in that field. Agent Garrett testified that he had completed two training sessions on bloodstain pattern interpretation, had analyzed bloodstain patterns in dozens of cases, and had previously testified in a homicide case as a bloodstain pattern interpretation expert. In addition, Agent Garrett described in detail to the judge and jury the difference between blood spatter and transfer stains and produced visual aids to illustrate his testimony.

Based on this testimony, the trial court reasonably could have determined that Agent Garrett was in a better position to have an opinion on bloodstain pattern interpretation than the trier of fact. There is more than one road to expertise that assists a jury in understanding the evidence or determining a fact at issue, and Agent Garrett's qualifications are not diminished, as defendant suggests, by the fact that he has never written an article, lectured, or taken a college-level course on bloodstain or blood spatter analysis. The trial court did not abuse its discretion in qualifying Agent Garrett as an expert. This assignment of error is overruled.

State v. Cook, 362 N.C. 285, 661 S.E.2d 874 (2008).

The Supreme Court held that for purposes of the discovery statute, a retrograde extrapolation of blood alcohol content required expert testimony.
Moreover, North Carolina courts have consistently regarded blood alcohol retrograde extrapolation as the domain of expert witnesses. *See, e.g.*, *State v. Davis*, 142 N.C. App. 81, 89--90, 542 S.E.2d 236, 241 (examining the "expert testimony" of a toxicologist under the standard of *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993), and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S. Ct. 1167, 143 L. Ed. 2d 238 (1999), and noting "[w]e have accepted the reliability of extrapolation evidence since 1985"), *disc. rev. denied*, 353 N.C. 386, 547 S.E.2d 818 (2001); *State v. Catoe*, 78 N.C. App. 167, 168-69, 336 S.E.2d 691, 692--93 (1985) (holding blood alcohol concentration retrograde analysis admissible when a "qualified expert" gave "opinion testimony on scientific matters" and noting the "simple mathematical extrapolation" performed), *disc. rev. denied*, 316 N.C. 380, 344 S.E.2d 1 (1986).

Crocker v. Roethling, 363 N.C. 140, 675 S.E.2d 625 (2009).

In a medical negligence case where the case was dismissed on summary judgment, the court stated that the trial courts should not make credibility determinations concerning expert witnesses. We have cautioned trial courts against "asserting sweeping pre-trial 'gatekeeping' authority . . . [which] may unnecessarily encroach upon the constitutionally-mandated function of the jury to decide issues of fact and to assess the weight of the evidence." *Howerton,* 358 N.C. at 468, 597 S.E.2d at 692 (citing, *inter alia*, N.C. Const. art I, § 25 and *Daubert v. Merrell Dow Pharms.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993)).

Court of Appeals Cases

State v. Spencer, 119 N.C. App. 662, 459 S.E.2d 812 (1995).

The primary issue presented by this appeal involves the exclusion of Dr. Gullick's testimony regarding her opinions which were based, at least in part, upon an evaluation of defendant with an instrument known as a penile plethysmograph. Had she been permitted to do so, Dr. Gullick would have testified to her opinion, based upon a personal interview of defendant, standardized psychological testing, and the plethysmograph testing, that although defendant has significant psychological problems, there was no evidence of his being sexually aroused by prepubescent children and the plethysmograph showed an "essentially . . . normal arousal pattern." Defendant sought to establish, by this testimony, that he did not exhibit characteristics commonly associated with persons who are likely to commit sexual crimes against children, and therefore, it was less likely that he committed the acts charged in this case. After a lengthy *voir dire*, the trial court sustained the State's objection to the testimony, insofar as it was based on the results of the plethysmograph, but indicated that Dr. Gullick would be permitted to state her opinion to the extent it was based on factors other than the plethysmograph. The trial court determined that the instrument was of questionable reliability; that the testimony was not relevant; and that even if relevant, its probative value was outweighed by its prejudicial effect.

The question of the admissibility of an expert witness' opinion testimony based on the results of penile plethysmograph testing has never been directly addressed by the appellate courts of this State. *See State v. McKinney*, 110 N.C. App. 365, 430 S.E.2d 300 (1993). In North Carolina, a qualified expert (the State does not dispute Dr. Gullick's qualifications as an expert clinical psychologist specializing in sexual dysfunction) may give opinion testimony on scientific matters if it "will assist the trier of fact to understand the evidence or to determine a fact in issue." N.C. Gen. Stat. § 8C-1, Rule 702 (1992). The expert may base his opinion on matters or data "perceived by or made known to him at or before the hearing", and the data itself need not be independently admissible in evidence "if of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject . . . ." N.C. Gen. Stat. § 8C-1, Rule 703 (1992).

Implicit in these rules is the precondition that the matters or data upon which the expert bases his opinion be recognized in the scientific community as sufficiently reliable and relevant. *See*

Daubert v. Merrell Dow, 509 U.S.579, 125 L. Ed. 2d 469. 113 S. Ct. 2786 (1993); *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984); N.C. Gen. Stat. § 8C-1, Rule 703 (1992). Whether scientific opinion evidence is sufficiently reliable and relevant is a matter entrusted to the sound discretion of the trial court. *State v. Catoe*, 78 N.C. App. 167, 336 S.E.2d 691 (1985), *disc. review denied,* 316 N.C. 380, 344 S.E.2d 1 (1986). "Reliability of a scientific procedure is usually established by expert testimony, and the acceptance of experts within the field is one index, though not the exclusive index, of reliability." *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990). Generally, our courts have focused on the following indicia of reliability: (1) the expert's professional background in the field; (2) the use of visual aids before the jury so that the jury is not asked "to sacrifice its independence by accepting [the] scientific hypotheses on faith;" and (3) independent research conducted by the expert. *Id.* at 98, 393 S.E.2d at 853, *quoting Bullard*, 312 N.C. at 150-51, 322 S.E.2d at 382.

At the *voir dire* hearing, Dr. Gullick testified that she utilizes penile plethysmograph testing as a part of her assessment of the sexual arousal patterns of her patients. She explained the operation of the instrument:

> The penile plethysmograph attempts to measure physiological indications of sexual arousal in response to particular stimulus materials. The individual is placed in a room and a mercury strain gauge is placed around the penis so that the circumference of the penis can be measured. And this mercury strain gauge is capable of measuring slight increases in circumference, many times before they are noticeable to the man himself.
>
> The individual is then presented with sequential stimulus materials, auditory and visual, encouraging him to think about and look at materials indicative of sexual activity with different ages of people, different genders and different sexual activities.

Dr. Gullick remarked that the plethysmograph has been extensively studied and recently shown to be ninety-five percent accurate in discriminating between individuals "who had committed sexual offenses against children and a control group that was randomly drawn from the population." Finally, she distinguished between the plethysmograph and the polygraph:

> The plethysmograph . . . directly measures the outside evidence of sexual arousal. We know, it's established throughout the literature that when a man becomes sexually aroused, there is engorgement of the penis. It's a one-to-one relationship.
>
> In a polygraph, galvanic skin responses are measured, and we have to make a leap of logic to think that galvanic skin response is related to anxiety, and therefore truthfulness. And it is that jump in logic that leads to a lack of reliability at times with that instrument . . . .
> We know when the penis becomes engorged, we are measuring sexual arousal. So it's much more akin to say blood pressure measurement.

The State's expert witness, Dr. Michael Tyson, was a clinical and forensic psychologist specializing in the field of sexual criminal behavior. He testified that he was familiar with the plethysmograph through his studies in behavior therapy and had read literature on the test and discussed it with other psychologists, although he did not use the instrument in his practice. Dr. Tyson testified that it was generally accepted in the mental health community by both proponents

and opponents of the plethysmograph "that the plethysmograph data does not give any evidence that is useful in determining whether an individual did or did not commit a specific act." He explained that while he agreed with Dr. Gullick that the plethysmograph accurately measures the engorgement of blood to the penis, there is substantial disagreement as to the extent to which the penile response is subject to voluntary control and as to whether the penile response as measured by the plethysmograph can then be generalized to anything else pertaining to sexual behavior. Dr. Tyson testified that the fact that the plethysmograph does not show evidence of sexual arousal when a subject is shown stimulus materials involving children does not lead to a valid conclusion that the person will not engage in sexual activities with children. He stated that the vast majority of individuals who commit sexual offenses against children are not sexually aroused by stimulus material involving children; "their primary sexual orientation is to adults and they molest children by fantasizing that they are engaging in relationships with appropriate sex partners." In Dr. Tyson's opinion, the plethysmograph has "very limited forensic utility", "the forensic validity of the instrument is highly suspect", and "the utility of what it [the plethysmograph] shows is highly questionable and the possibility of misleading the trier of fact or the jury is very high, dangerously high . . . ."

We agree with the trial court that the evidence before it by no means established the reliability of the plethysmograph; there is a substantial difference of opinion within the scientific community regarding the plethysmograph's reliability to measure sexual deviancy. *See e.g.*, Barker and Howell, *The Plethysmograph: A Review of Recent Literature,* 20 Bull. Am. Acad. of Psychiatry and Law 13 (1992) (identifying several problems with the reliability of the plethysmograph, namely "lack of standards for training and interpretation of data, lack of norms and standardization and susceptibility of the data to false negatives and false positives," and concluding that "despite the sophistication of the current equipment technology, a question remains whether the information emitted is a valid and reliable means of assessing sexual preference"); *see also,* Myers, et al., *Expert Testimony in Child Sexual Abuse Litigation,* 68 Neb. L. Rev. 1, 134-35 (1989) (stating that a problem with the reliability of penile plethysmograph testing is that penile response is subject to voluntary control, and the test should not be used to determine whether or not an individual has engaged in deviant behavior). Other jurisdictions have also found the plethysmograph unreliable as a measure of sexual deviancy. *See e.g.*, *Gentry v. State*, 213 Ga. App. 24, 443 S.E.2d 667 (1994); *In the Interest of A.V.*, 849 S.W.2d 393 (Tex.App. 1993); *Cooke v. Naylor*, 573 A.2d 376 (Me. 1990); *Nelson v. Jones*, 781 P.2d 964 (Alaska 1989), *cert. denied*, 498 U.S. 810, 112 L. Ed. 2d 20, 111 S. Ct. 44 (1990); *Dutchess County Dept. of Social Services on behalf of T.G. v. Mr. G.*, 141 Misc. 2d 641, 534 N.Y.S.2d 64 (1988); *People v. John W.*, 185 Cal. App. 3d 801, 229 Cal. Rptr. 783 (1986).

Nevertheless, defendant contends Dr. Gullick's testimony should have been admitted because "the admission of controversial scientific evidence is especially prevalent in cases of child sexual abuse." By way of example, she cites several cases where the use of anatomical dolls by a child witness has been approved and where opinion testimony on "syndromes" or "profiles" has been permitted. Defendant's argument is without merit. In allowing children to testify using anatomically correct dolls, both this Court and the North Carolina Supreme Court have not classified the dolls as scientific evidence and thus, they do not have to satisfy the reliability standard under the North Carolina Rules of Evidence as the plethysmograph does. Indeed, the North Carolina Supreme Court in *State v. Fletcher*, 322 N.C. 415, 368 S.E.2d 633 (1988),

likened the use of dolls to "the use of photographs and other items to illustrate testimony." With regard to opinion testimony on syndromes or profiles thought to be consistent with sexual abuse, our appellate courts have found such testimony to be proper subject matter for expert testimony only after much scrutiny and sufficient recognition in the scientific community, and have imposed strict limitations on its use. *See* State v. Hall, 330 N.C. 808, 412 S.E.2d 883 (1992).

In the present case, plethysmograph testing formed the basis for Dr. Gullick's opinion that defendant was not sexually aroused by children, thereby making it less likely that he committed the acts charged. In view of the lack of general acceptance of the plethysmograph's validity and utility and therefore, its reliability for forensic purposes in the scientific community in which it is employed, we hold that the trial court did not abuse its discretion in finding defendant's plethysmograph testing data insufficiently reliable to provide a basis for the opinion testimony which defendant sought to elicit from Dr. Gullick.

Moreover, for evidence to be admissible, it must be relevant. N.C. Gen. Stat. § 8C-1, Rule 402 (1992). "The test of relevancy of evidence is whether it has 'any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence.'" *State v. Gappins*, 320 N.C. 64, 68, 357 S.E.2d 654, 657 (1987), *quoting* N.C. Gen. Stat. § 8C-1, Rule 401 (1986). In view of the evidence before the trial court tending to show that a lack of penile response to sexual stimuli involving children is not probative of one's guilt or innocence of child sexual abuse, we question, without deciding, the relevance of Dr. Gullick's testimony, but agree with the trial court that any probative value it may have had was substantially outweighed by the risk that the testimony could mislead the jury, confuse the issues, and suggest a decision on an improper basis, i.e., the results of the test itself. *See* N.C. Gen. Stat. § 8C-1, Rule 403 (1992); *Hall, supra; State v. Knox*, 78 N.C. App. 493, 337 S.E.2d 154 (1985). Thus, we hold that the trial court did not abuse its discretion in excluding Dr. Gullick's opinion testimony to the extent it was based on the results of the plethysmograph. This assignment of error is overruled.

Setzer v. Boise Cascade Corp., 123 N.C. App. 441, 473 S.E.2d 431 (1996).

It is well recognized that an expert may testify regarding the ultimate issue. *Beam v. Kerlee*, 120 N.C. App. 203, 215, 461 S.E.2d 911, 920 (1995), *cert. denied*, 342 N.C. 651, 467 S.E.2d 703 (1996). Furthermore, our Supreme Court has recently clarified the task of trial judges when faced with a proffer of expert scientific testimony in the case of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993). In *Daubert,* the Court held that the trial judge must determine "whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue." *Daubert,* 509 U.S. at ____, 125 L. Ed. 2d at 482. The Court said that a pertinent consideration is whether the "theory or technique has been subjected to peer review and publication." *Daubert,* 509 U.S. at ____, 125 L. Ed. 2d at 483.

State v. Dennis, 129 N.C. App. 686, *500 S.E.2d 765 (1998).*

The issue of whether the results of the "Phadebas methodology" are sufficiently reliable to be admitted at trial appears to be one of first impression in this jurisdiction. HN3 According to N.C. Gen. Stat. § 8C-1, Rule 402 (1992), "all relevant evidence is admissible," and "evidence which is not relevant is not admissible." Evidence is relevant if it has "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." N.C. Gen. Stat. § 8C-1, Rule 401 (1992). The admissibility of expert testimony is governed by N.C. Gen. Stat. § 8C-1, Rule 702(a) (Cum. Supp. 1997), which provides that "if scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion."

Thus, when expert testimony is sought to be introduced at trial, the trial court must determine whether the expert proposes to testify to scientific, technical, or other specialized knowledge that will assist the trier of fact. "This requires a preliminary assessment of whether the reasoning or methodology underlying the testimony is sufficiently valid and whether that reasoning or methodology can be properly applied to the facts in issue." *State v. Goode*, 341 N.C. 513, 527, 461 S.E.2d 631, 639 (1995); *see also Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993).

"A new scientific method of proof is admissible at trial if the method is sufficiently reliable." *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990). "Reliability of a scientific procedure is usually established by expert testimony, and the acceptance of experts within the field is one index, though not the exclusive index, of reliability." *Id.* The courts of our jurisdiction rely on the following indices of reliability: "the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith,' and independent research conducted by the expert." *Id.* at 98, 393 S.E.2d at 853 (quoting *State v. Bullard*, 312 N.C. 129, 150-51, 322 S.E.2d 370, 382 (1984)).

In the instant case, both defendant and the State agree that Barker qualified as an expert in the field of forensic serology. Barker testified that she received a Bachelor of Science from Northern Illinois University, that she was a board certified member of the Medical Technology Association, and that she attended graduate level molecular genetics classes at North Carolina State University, in addition to other workshops and meetings in her field. She also testified that she had been assigned by the State Bureau of Investigation to work on approximately 120 to 140 cases, not including the 50 to 70 cases she worked on as an intern.

After reviewing the record, we conclude the trial court did not err by allowing Barker to testify regarding the results of the "Phadebas methodology." Barker's testimony that the test is commonly used by serologists to detect the presence of saliva was uncontradicted by defendant. Barker explained in a clear and concise manner how the test is performed. While she did not employ visual aids to assist the jury in comprehending the test, visual aids were unnecessary in light of the fact that the test involves little discretion or room for error in determining the

presence of amylase. If amylase is present, blue dye is released; if no amylase is present, no dye is released. Barker stated that the concentration of amylase in saliva is much greater than that found in other fluids, and that she had found no fluid other than saliva tested positive for the presence of amylase. Thus, the jury was not required to "sacrifice its independence by accepting [the] scientific hypotheses on faith" as in a case involving a more complicated test. *Bullard*, 312 N.C. at 151, 322 S.E.2d at 382.

Further, Barker testified only that the results of the test indicated the presence of saliva on the vaginal swab taken from the victim's vagina, and not that saliva was present on the swab or that the saliva came from a particular person. We nevertheless believe her testimony regarding the test results was relevant to the issue of whether defendant committed a first degree sexual offense against the victim. *See Goode*, 341 N.C. at 538, 461 S.E.2d at 645 (stating that the fact that the State could not show the source or type of a microscopic quantity of blood on defendant's boot went to the weight of the evidence and not its admissibility). "'An individual piece of evidence need not conclusively establish a fact to be of some probative value. It need only support a logical inference of the fact's existence.'" *Id.* at 537, 461 S.E.2d at 645 (quoting *State v. Payne*, 328 N.C. 377, 401, 402 S.E.2d 582, 596 (1991), *cert. denied*, 514 U.S. 1038, 131 L. Ed. 2d 292, 115 S. Ct. 1405 (1995)). For these reasons, we agree with the trial court that Barker's testimony established the reliability of the "Phadebas methodology" and was therefore properly admissible. We observe that other jurisdictions have also found such evidence to be properly admissible. *See State v. Zola*, 112 N.J. 384, 548 A.2d 1022 (N.J. 1988), *cert. denied*, 489 U.S. 1022, 103 L. Ed. 2d 205, 109 S. Ct. 1146 (1989), *superseded by statute on other grounds as stated in State v. Delibero*, 149 N.J. 90, 692 A.2d 981 (N.J. 1997); *see also State v. Moralevitz*, 70 Ohio App. 2d 20, 433 N.E.2d 1280 (Ohio Ct. App. 1980); A. E. Kipps and P. H. Whitehead, *The Significance of Amylase in Forensic Investigations of Body Fluids*, 6 Forensic Science 137, 137 (1975) ("The presence of a high amylase activity in a human body fluid has for a long time been taken as indicative of saliva, and has provided a valuable screening test for saliva stains during forensic investigations[]").

With respect to defendant's argument that the trial court should have excluded the results of the test pursuant to N.C. Gen. Stat. § 8C-1, Rule 403, we note that the decision to admit evidence subsequent to a Rule 403 analysis rests within the discretion of the trial court, and the ruling will not be disturbed absent a showing of an abuse of discretion. *Goode*, 341 N.C. at 538, 461 S.E.2d at 646. As mentioned previously, in the instant case, Barker testified only that the results of the test indicated the presence of saliva on the vaginal swab taken from the victim's vagina, and not that saliva was present on the swab or that the saliva came from a particular person. Thus, this testimony served to corroborate other evidence, including the victim's testimony, which tended to show that defendant committed a first degree sexual offense against the victim. We also observe that defendant failed to request a limiting instruction with respect to Barker's testimony. We therefore conclude that the trial court did not abuse its discretion by admitting Barker's testimony regarding the results of the "Phadebas methodology."

State v. Cardwell, 133 N.C. App. 496, 516 S.E.2d 388 (1999).

Defendant contends on appeal that the Analyzer constituted reliable scientific evidence in his driving while impaired case.

Expert testimony based on a scientific method of proof is generally admissible if the expert's "scientific, technical or other specialized knowledge will assist the trier of fact." N.C.G.S. § 8C-1, Rule 702(a) (Supp. 1998). In determining whether a scientific method of proof will assist the trier of fact in a given case, the trial court must determine whether the method is reliable. *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990). The trial court may take judicial notice that a scientific method of proof is reliable; however, in cases where the scientific method of proof at issue is a relatively new one, reliability "is usually established by expert testimony." *Id.*; *State v. Bullard*, 312 N.C. 129, 148, 322 S.E.2d 370, 381 (1984); 1 Kenneth S. Broun, *Brandis & Broun on North Carolina Evidence* § 113 (5th ed. 1998) [hereinafter *Brandis & Broun on Evidence*]. The general acceptance of a particular method by the scientific community may be one indicator of its reliability; however, a lack of general acceptance is not dispositive. *Pennington*, 327 N.C. at 98, 393 S.E.2d at 852; *Bullard*, 312 N.C. at 145, 322 S.E.2d at 379. Other factors the trial court may consider in determining the reliability of an expert's scientific method of proof include: (1) the expert's professional background; (2) independent research conducted by the expert; (3) the use of established techniques; and (4) explanatory testimony (including, for example, the "use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith'"). *Pennington*, 327 N.C. at 98, 393 S.E.2d at 853 (quoting *Bullard*, 312 N.C. at 151, 322 S.E.2d at 382); *cf. Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94, 125 L. Ed. 2d 469, 482-83, 113 S. Ct. 2786 (1993) (noting that some of the "many" possible factors for consideration include empirical testing of the new scientific technique, peer review and publication, the known or potential rate of error, and general acceptance by the scientific community). We review the trial court's reliability determination under an abuse of discretion standard. *State v. Spencer*, 119 N.C. App. 662, 664, 459 S.E.2d 812, 814, *disc. review denied*, 341 N.C. 655, 462 S.E.2d 524 (1995); *cf. Kumho Tire Co., Ltd. v. Carmichael*, U.S. , 119 S. Ct. 1167, 143 L. Ed. 2d 238, 67 U.S.L.W. 4179 (1999) (noting that federal rule 702, which is, in relevant part, identical to our Rule 702, vests "discretionary authority, reviewable for its abuse," in the trial court). Accordingly, we will reverse the trial court's determination on this issue "only upon a showing that its ruling was so arbitrary that it could not have been the result of a reasoned decision." *See State v. Cagle*, 346 N.C. 497, 506-07, 488 S.E.2d 535, 542, *cert. denied*, 522 U.S. 1032, 118 S. Ct. 635, 139 L. Ed. 2d 614 (1997).

In this case, the trial court's findings reveal its consideration of the Analyzer's general acceptance in both the medical and forensic fields, the fact that the Analyzer is an established technique for measuring alcohol concentration, and the professional backgrounds of the individuals who operate and/or rely on the Analyzer. Accordingly, as the trial court's findings reflect its consideration of relevant factors for determining the admissibility of scientific evidence and are reasonably supported by the evidence presented, the trial court did not abuse its discretion in determining that the Analyzer is a reliable scientific method of proof. *See State v. Drdak*, 330 N.C. 587, 592, 411 S.E.2d 604, 607 (1992) (noting that N.C.G.S. § 20-139.1(a), which provides for one method of blood-alcohol content analysis, allows for the admission of other competent

evidence, including other chemical tests, to show a defendant's blood-alcohol level).

Furthermore, the trial court's findings reveal its consideration of whether the Analyzer results, although generally reliable, were inadmissible due to Defendant's particular circumstances. *See* *Pennington*, 327 N.C. at 101, 393 S.E.2d at 854 ("The evidence [obtained from a reliable scientific method of proof] may be found to be so tainted that it is totally unreliable and, therefore, must be excluded."). The trial court found there was "no credible evidence that [Defendant's] elevated LDH skewed the result of the plasma alcohol test"; elevated LDH alone would not cause "a false positive reading"; there "were body chemistry readings which indicate that [Defendant's] lactic acid was not increased"; and the "saline solution administered to [Defendant] . . . did not so effect the chemistry in [Defendant's] blood plasma as to make the blood plasma alcohol reading here so unreliable as to be inadmissible." The trial court's findings reveal that its determination that Defendant's results were not so tainted as to be totally unreliable was the result of a reasoned decision; accordingly, the trial court did not abuse its discretion.

Defendant also challenges the reliability of the conversion ratio used to convert her plasma-alcohol concentration to its blood-alcohol concentration equivalent. The trial court received evidence that 1 to 1.18 is the generally accepted conversion ratio in the forensic field and that numerous studies have found ratios between 1 to 1.15 and 1 to 1.21 to be accurate for the overwhelming majority of participants. The trial court's findings also reveal its consideration of the professional background of the expert employing the 1 to 1.18 ratio. Based on this evidence, the trial court found a conversion ratio of 1 to 1.18 to be reliable, and we see no abuse of discretion in this determination based on the evidence presented in this case. In any event, even using a conversion ratio of 1 to 1.21, the highest conversion ratio deemed reliable by Dr. Waggoner based on his review of numerous studies, Defendant's blood-alcohol concentration was above the legal limit.

State v. Bates, 140 N.C. App. 743, 538 S.E.2d 597 (2000).

The trial court allowed Dr. Everette to testify as an expert on child sexual abuse. An expert may testify about her opinion so long as her opinion is relevant, helpful to the jury, and based on an adequate scientific foundation. N.C.R. Evid. 702 and 705; *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995) (adopting *Daubert v. Merrell Dow*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993)). The defendant argues that Dr. Everette's opinion that the child was sexually abused lacked a proper foundation and should not have been admitted. We agree with this assertion.

The testimony offered by Dr. Everette is similar to testimony offered by two doctors in *State v. Trent*, 320 N.C. 610, 359 S.E.2d 463 (1987) and *State v. Parker*, 111 N.C. App. 359, 432 S.E.2d 705 (1993). In both of those cases, a doctor conducted an interview and a physical examination of a child who claimed she had been abused. In both cases, the physical examination revealed no evidence that the child had been sexually abused. But in both cases, the doctors "diagnosed" the children as victims of sexual abuse based solely on the children's statements that they had been abused. Our Supreme Court in *Trent* and this Court in *Parker* found that this opinion testimony

lacked a proper foundation and should not have been admitted.

In the case at bar, Dr. Everette testified that she completed a thorough physical examination of the child and tested her for a variety of sexually transmitted diseases. The child's body showed no signs of abuse--no scars, no enlarged vaginal opening, no missing or torn hymen, etc.--and the tests for disease all came back negative. Yet Dr. Everette opined that the child was the victim of sexual abuse, which opinion was based entirely on statements made by the child to Rockwell-Flick. In fact, the defendant asked Dr. Everette, "the only thing that leads you to believe it's sexual abuse is what the child told Ms. Flick?" Dr. Everette answered "Correct." We need not address the legitimacy of Rockwell-Flick's methods or findings to hold that Dr. Everette's "diagnosis" was improperly admitted.

State v. Davis, 142 N.C. App. 81, 542 S.E.2d 236, (2001).

Defendant's second basis for objection is that the foundation for Dr. Mason's testimony was not sufficient to meet the standard of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 143 L. Ed. 2d 238, 119 S. Ct. 1167 (1999). The defendant argues that only one *Daubert* factor was addressed by the State in laying the foundation for the expert's testimony and that the court abused its discretion in admitting the testimony relying on an insufficient foundation. Both *Daubert* and *Kumho* discuss the need for the "reliability" factors to be flexible. The court noted that without discretionary authority trial courts would be unable to avoid "reliability proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert's reliability arises." *Kumho*, 526 U.S. at 152, 143 L. Ed. 2d at 253. HN16 We have accepted the reliability of extrapolation evidence since 1985. *State v. Catoe*, 78 N.C. App. 167, 336 S.E.2d 691 (1985). The court noted that other states have recognized the reliability of extrapolation evidence. *Id.* Dr. Mason testified that his basis of understanding came from a "large number of studies." Defendant did not object to Dr. Mason's qualifications. There being no abuse of discretion on this record, this assignment of error is overruled.

State v. Berry, 143 N.C. App. 187, 546 S.E.2d 145 (2001).

Defendant argues that Kennedy's own testimony reveals that barefoot impression evidence is not yet scientifically reliable, and its admission was unduly prejudicial. We agree that, based on Kennedy's own testimony, this evidence was not sufficiently reliable at the time of trial. However, after reviewing the entire record, we find the admission of Kennedy's testimony to be harmless.

Rule 702(a) of the North Carolina Rules of Evidence provides:

If scientific, technical or other specialized knowledge will assist the trier of fact to understand the

evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion.

N.C. Gen. Stat. § 8C-1, Rule 702 (1999). "Thus, under our Rules of Evidence, when a trial court is faced with a proffer of expert testimony, it must determine whether the expert is proposing to testify to scientific, technical, or other specialized knowledge that will assist the trier of fact to determine a fact in issue." *State v. Goode*, 341 N.C. 513, 527, 461 S.E.2d 631, 639 (1995).

The acceptance of a witness as an expert and "the admission of expert testimony are within the sound discretion of the trial court and will not be upset absent a showing of an abuse of discretion." *State v. Willis*, 109 N.C. App. 184, 192, 426 S.E.2d 471, 473 (1993) (citing *State v. Parks*, 96 N.C. App. 589, 386 S.E.2d 748 (1989)). "The expert is not required to have specific credentials, *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984), and it is sufficient if the scientific technique supporting his testimony is reliable." *Willis*, 109 N.C. App. at 192, 426 S.E.2d at 473 (emphasis supplied) (citation omitted). Our Supreme Court has stated that:

> This Court is of the opinion, that we should favor the adoption of scientific methods of crime detection, where the demonstrated accuracy and reliability has become established and recognized. Justice is truth in action, and any instrumentality, which aids justice in the ascertainment of truth, should be embraced without delay.

State v. Temple, 302 N.C. 1, 12 273 S.E.2d 273, 280 (1981) (citation omitted) (emphasis supplied). "As recognozed by the United States Supreme Court in [*Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993)], the admissibility of expert scientific testimony...requires a preliminary assessment of whether the reasoning or methodology underlying the testimony is sufficiently valid and whether that reasoning or methodology can be properly applied to the facts in issue." *Goode*, 341 N.C. at 527, 461 S.E.2d at 639.

"In *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984), [our Supreme Court,] addressing the reliability of footprint identification, gave a comprehensive review of the law concerning the determination of whether a proffered method is sufficiently reliable." *Goode*, 341 N.C. at 527, 461 S.E.2d at 639. The *Bullard* Court stated the following rule with regards to assessing the reliability of a scientific method:

> In general, when no specific precedent exists, scientifically accepted reliability justifies admission of the testimony of qualified witnesses, and such reliability may be found either by judicial notice or from the testimony of scientists who are expert in the subject matter, or by a combination of the two.

Bullard, 312 N.C. at 148, 322 S.E.2d at 381 (quoting 1 Henry Brandis, Jr., *Brandis on North Carolina Evidence* § 86, at 323 (2d ed. 1982)).

In *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852-53 (1990), our Supreme Court examined the reliability of a scientific method by setting out the following principles:

Reliability of a scientific procedure is usually established by expert testimony, and the acceptance of experts within the field is one index, though not the exclusive index, of reliability. *See* State v. Bullard, 312 N.C. at 147, 322 S.E.2d at 380; State v. Peoples, 311 N.C. 515, 532, 319 S.E.2d 177, 187 (1984).We have focused on the following indices of reliability: the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith,' and independent research conducted by the expert. *State v. Bullard*, 312 N.C. at 150-51, 322 S.E.2d at 382.

Where a scientific method is in its "infancy", our Courts have looked to other jurisdictions. *Bullard*, 312 N.C. at 148, 322 S.E.2d at 381. Our research reveals two recent cases in South Carolina and Texas specifically addressing Kennedy's research.

Kennedy testified as a witness for the State of South Carolina in a first degree murder trial held in Lexington, South Carolina. *State v. Jones*, 343 S.C. 562, 541 S.E.2d 813 (2001). In *Jones*, the only physical evidence found at the crime scene was a "bloody boot print." *Id*. at , 541 S.E.2d at 814. The trial court admitted Kennedy as an expert in "barefoot insole impression" analysis. *Id*. at , 541 S.E.2d at 818. The State introduced testimony that the "barefoot impressions" in the boot were "consistent with the boots having been worn by the [defendant]." *Id*. at , 541 S.E.2d at 819. The South Carolina Supreme Court held:

> The State relies most heavily on Kennedy to establish that there is a science underlying "barefoot insole impressions." While Kennedy testified that he had published several peer-reviewed articles, he also testified that he was still in the process of collecting data in order to determine which standards were appropriate for comparison purposes. Further he candidly acknowledged that earlier work in this area had been discredited...In our opinion, it is premature to accept that there exists a science of 'barefoot insole impressions'...We find, therefore, that the trial judge erred in permitting expert testimony purporting to demonstrate that "barefoot insole impression" testing revealed [defendant's] foot to be consistent with the impression made by the primary wearer of the...[crime scene] boot.

Id. The South Carolina Supreme Court vacated the death sentence and remanded the case for a new trial.

Kennedy also testified as an expert in another murder trial in Lubbock, Texas. *Hurrelbrink v. State*, 46 S.W.3d 350, 2001 Tex. App. LEXIS 2195, No. 07-99-0376- CR, 2001 WL 324726 (Tex. App. April 4, 2001). In *Hurrelbrink*, a "bloody sock foot print was found at the crime scene which the State purported to tie to [defendant] through the testimony of two anthropologists [Dr. Gill-King and Dr. Sonek] as to footprint comparison and analysis." *Id*. In *Hurrelbrink*, Kennedy testified as an expert witness for the defendant. *Id*.

Dr. Sonek testified during *voir dire* that there was a "positive identification" between the footprints at the crime scene and the defendant's footprints. *Id*. Kennedy testified that he would not make a "positive identification on that type of evidence because 'the clarity is not to the point where I would want it.'" *Id*. Kennedy stated "that if Dr. Sonek concluded it was likely or

probably the same person, [I] would have agreed, but [I do] not agree with a positive identification." *Id*. The trial court, agreeing with Kennedy, "did not believe that sufficient research had been done to opine that no two individuals can ever have the same identical footprint, Dr. Sonek was not allowed to testify to such an opinion." *Id*.

In *Hurrelbrink*, defendant argued that it was error to admit the "barefoot impression" testimony because such testimony "was not grounded in a valid underlying scientific theory." *Id*. The Texas Court of Appeals held that: "We do not believe that the trial court abused its discretion in allowing this testimony." The Court elaborated that "based...on the other evidence presented at trial, as well as the limitations imposed on Dr. Sonek's...testimony, we believe that any error [in admitting the barefoot impression testimony] was harmless." *Id*.

In the present case, we agree that, based on Kennedy's testimony, the barefoot impression evidence does not yet meet the requirements for admissibility. Kennedy is undoubtedly an expert in many areas of forensic science. However, Kennedy testified that he was still in the process of collecting data with regard to "barefoot impression" analysis and that his research was not yet complete. Kennedy opined:

> We don't believe at present we can identify a barefoot impression until our research is done. The research is showing that the barefoot is unique to the individual but obviously my research is ongoing, so I can't do research to prove that and before it's done say 'yes,' we can.

Therefore, based on Kennedy's own testimony, barefoot impression analysis was not scientifically reliable as of the date of this trial. However, we hold that the admission of this testimony was harmless error.
Taylor v. Abernethy, 149 N.C. App. 263, 560 S.E.2d 233 (2002).

The trial court concluded Perrotta could testify as a person who has knowledge of the characteristics of handwriting, but that he could not give an opinion because the court "simply does not have any scientific basis to conclude that [Perrotta] can answer the ultimate question about is this signature Romer Taylor's." The trial court reasoned that there is no scientific evidence that handwriting analysis "is a valid way to determine anything," and "an expert witness is supposed to testify as to scientific fact."

In fact, ". . . 'North Carolina case law requires only that the expert be better qualified than the jury as to the subject at hand, with the testimony being "helpful" to the jury.'" *State v. Jones*, 147 N.C. App. 527, __, 556 S.E.2d 644, 654 (2001) (citations omitted); *see also Beam v. Kerlee*, 120 N.C. App. 203, 215, 461 S.E.2d 911, 920 (1995) (under Rules of Evidence, "an expert may testify in the form of an opinion if the testimony will help the trier of fact understand the evidence"), *cert. denied*, 342 N.C. 651, 467 S.E.2d 703 (1996). HN6 While it is certainly true that the trial court must act as gatekeeper in determining the reliability of expert testimony being offered, there is simply no requirement that a party offering the testimony must produce evidence that the testimony is based in science or has been proven through scientific study.

Our Rules of Civil Procedure make clear that expert testimony may be based not only on

scientific knowledge, but also on technical or other specialized knowledge not necessarily based in science. N.C. Gen. Stat. § 8C-1, Rule 702 (a) (1999) ("if scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion"). The rules clearly provide that an expert who testifies to any of the matters permitted under Rule 702, including testimony based on specialized knowledge, is entitled to give an opinion based upon that knowledge. *See* N.C. Gen. Stat. § 8C-1, Rule 702(a); N.C. Gen. Stat. § 8C-1, Rule 705 (1999) ("the expert may testify in terms of opinion or inference and give his reasons therefor"). This opinion may be rendered even though it amounts to an expert opinion on the ultimate issue to be determined by the jury. *See* N.C. Gen. Stat. § 8C-1, Rule 704 (1999) ("testimony in the form of an opinion or inference is not objectionable because it embraces an ultimate issue to be decided by the trier of fact"); *State v. Teague*, 134 N.C. App. 702, 708, 518 S.E.2d 573, 577 (1999) (experts may render opinion on ultimate issue to be determined by jury), *appeal dismissed and cert. denied*, 351 N.C. 368, 542 S.E.2d 655 (2000).

In its role as gatekeeper, the pertinent question for the trial court is not whether the matters to which the expert will testify are scientifically proven, but simply whether the testimony is sufficiently reliable. *See Daubert v. Merrell Dow*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993) ("general acceptance" test of admissibility for scientific evidence no longer applicable; test is whether methodology underlying testimony is sufficiently valid and reliable); *see also, Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 143 L. Ed. 2d 238, 119 S. Ct. 1167 (1999) (holding *Daubert's* general "gatekeeping" obligation of determining reliability applies not only to scientific knowledge, but also to technical or other specialized knowledge). Our Supreme Court, citing *Daubert*, has set forth the proper analysis for our courts in determining the admissibility of expert testimony, including technical or other specialized knowledge. *See State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995).

According to *Goode*, when faced with the proffer of expert testimony, the trial court must first "determine whether the expert is proposing to testify to scientific, technical, or other specialized knowledge that will assist the trier of fact to determine a fact in issue." *Id.* at 527, 461 S.E.2d at 639. This requires a preliminary assessment of whether the basis of the expert's testimony is "sufficiently valid and whether that reasoning or methodology can be properly applied to the facts in issue." *Id.; see also State v. Berry*, 143 N.C. App. 187, 203-04, 546 S.E.2d 145, 156-57, *disc. rev. denied*, 353 N.C. 729, 551 S.E.2d 439 (2001). In making this determination of reliability, our Supreme Court noted that our courts have focused on the following indicia of reliability: ". . . 'the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked "to sacrifice its independence by accepting [the] scientific hypotheses on faith," and independent research conducted by the expert.'" 341 N.C. at 528, 461 S.E.2d at 640 (citations omitted).

It is clear under *Goode* that the admissibility of expert testimony is not dependent upon its having a scientific basis. Under the *Goode* analysis, expert testimony may be deemed to be reliable notwithstanding that it is not based in science. We therefore conclude the trial court committed an error of law in refusing to permit Perrotta to render an expert opinion on the basis that handwriting analysis is not based in science and has not been scientifically proven. The trial

court's proper inquiry must be guided by the factors set forth in *Goode*, which simply require that the expert's testimony be sufficiently reliable.

Moreover, nothing in *Daubert* or *Goode* requires that the trial court re-determine in every case the reliability of a particular field of specialized knowledge consistently accepted as reliable by our courts, absent some new evidence calling that reliability into question. Our courts have consistently held expert testimony in the field of handwriting analysis to be admissible. *See*, *e.g.*, *State v. LeDuc*, 306 N.C. 62, 68-69, 291 S.E.2d 607, 611-12 (1982) (noting our courts have repeatedly allowed experts "to testify on the authenticity of a given handwritten document if he qualified because of his skill in handwriting analysis," and stating expert witness may "compare[] the handwriting on the contested document with a genuine standard. Based on this comparison he gives his opinion on the authenticity of the contested document"), *overruled on other grounds*, *State v. Childress*, 321 N.C. 226, 362 S.E.2d 263 (1987); *State v. Horton*, 73 N.C. App. 107, 111-12, 326 S.E.2d 54, 56 (1985) (expert witness in handwriting analysis permitted to give opinion on validity of disputed document); *In re Ray*, 35 N.C. App. 646, 647-48, 242 S.E.2d 194, 195 (1978) (expert witness in field of handwriting analysis permitted to testify to observations concerning handwriting on contested will and exemplars of decedent's writing and to render opinion on the ultimate issue of whether deceased had written will).

Applying the *Goode* factors to the present case, we hold the trial court erred in refusing to allow Perrotta to render an expert opinion. The record sufficiently establishes that Perrotta's testimony meets the four indicia of reliability set forth in *Goode*. Perrotta testified about was comparative methodology, that it is an established, recognized, and accepted technique used by many in the field of handwriting analysis, and that it is reliable in that someone with his qualifications employing the same methodology would come to the same conclusions. Perrotta's professional background in the field, dating back to 1975, is extensive, and the trial court acknowledged that he was well-trained and qualified in the field. Moreover, Perrotta used various visual aids and enlargements of Romer's handwriting and signature in explaining to the jury his observations about the signature on the 10 July 1978 contract as compared to genuine exemplars. He has also had extensive study in the field of handwriting analysis independent of his testimony in this case. We further believe that the trial court's error in determining the admissibility of Perrotta's opinion testimony prejudiced plaintiff to the extent that he is entitled to a new trial. Perrotta was prepared to give an expert opinion on the ultimate fact at issue, whether the signature on the 10 July 1978 contract was Romer's. Given the weight which the jury could have afforded an opinion given by an expert with Perrotta's qualifications, plaintiff is entitled to have the jury consider this testimony.

Finally, we address defendants' cross-assignment of error to the trial court's denial of their motion to dismiss plaintiff's complaint as barred by Pennsylvania's six-year statute of limitations. Defendants argue that the statute of limitations began to run on plaintiff's cause of action as soon as the contract was executed because it provided that Romer would "immediately" make a will leaving his estate to plaintiff, which he did not do. However, under Pennsylvania law, a cause of action for breach of an agreement to make a will begins to run at the death of the party agreeing to devise. *See* *Zimnisky v. Zimnisky*, 210 Pa. Super. 266, 270, 231 A.2d 904, 906 (1967) (agreement to make a will is not testamentary in nature, but is a contract "with part performance postponed until the death of one of the parties"); *In* *Re Hofmann Estate*, 64 Pa. D. & C. 575, 64

Monag. 194 (1948) (measuring damages for breach of contract to make a will from point of death, not execution of contract).

Walter v. Walter, 149 N.C. App. 723, 561 S.E.2d 571 (2002).

In an equitable distribution proceeding, the trial court is to determine the net fair market value of the property based on the evidence offered by the parties. *Carlson v. Carlson*, 127 N.C. App. 87, 91, 487 S.E.2d 784, 786,*disc. review denied*, 347 N.C. 396, 494 S.E.2d 407 (1997). There is no single best method for assessing that value, *Poore v. Poore*, 75 N.C. App. 414, 419, 331 S.E.2d 266, 270,*disc. review denied*, 314 N.C. 543, 335 S.E.2d 316-17 (1985), but the approach utilized must be "sound," *id.* at 422, 331 S.E.2d at 272. In other words, the trial court must determine whether the methodology underlying the testimony offered in support of the value of a marital asset is sufficiently valid and whether that methodology can be properly applied to the facts in issue. *State v. Goode*, 341 N.C. 513, 527, 461 S.E.2d 631, 639 (1995) (citing *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993)). A party believing the methodology used by a witness is not valid or, if valid, is not properly applied to the facts at issue, has an obligation to object to its admission. *See* N.C.G.S. § 8C-1, Rule 103(a)(1) (1999). If a timely objection is not lodged at trial, it cannot be argued on appeal that the trial court erred in relying on this evidence in determining the value of the asset at issue. *See* N.C.R. App. P. 10(b)(1); *State v. Lucas*, 302 N.C. 342, 349, 275 S.E.2d 433, 438 (1981) (admission of evidence without an objection is "not a proper basis for appeal").

In this case, Plaintiff offered the testimony of Pulliam, who was qualified as an expert in the area of the valuation of professional practices. He gave his opinion as to the value of the Practice, and Defendant offered no objection to that opinion, nor did Defendant object to the methodology utilized in reaching the opinion. On appeal, Defendant argues the methodology used by Pulliam was flawed and thus the trial court could not rely on it for the purpose of determining value. No objection was entered at trial to the valuation methodology utilized by Pulliam or its application to the facts of this case. Thus, Defendant is precluded from challenging the trial court's valuation findings based on this methodology on the ground that it failed to "reasonably approximate[] the net value of the [asset]." *See Fountain*, ___ N.C. App. at ___, 559 S.E.2d at 32. Accordingly, Defendant's assignments of error regarding the valuation of the Practice are overruled.

State v. Holland, 150 N.C. App. 457**,** 566 S.E.2d 90 (2002).

We also disagree with defendant that Trooper Hiatt's testimony should have been excluded because it failed to meet the reliability requirements of *Daubert v. Merrell Dow*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993), as interpreted by our Supreme Court in *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995). As with the decision on who qualifies as an expert, the decision on what expert testimony to admit is within the wide discretion of the trial court. *See State v. Washington*, 141 N.C. App. 354, 362, 540 S.E.2d 388, 395 (2000), *disc. review denied*, 353 N.C. 396, 547 S.E.2d 427 (2001).

In *Taylor v. Abernethy*, __ N.C. App. __, 560 S.E.2d 233 (2002), this Court very recently analyzed the requirements of the admission of expert testimony set forth in *Daubert*, and particularly *Goode*. We noted that "nothing in *Daubert* or *Goode* requires that the trial court re-determine in every case the reliability of a particular field of specialized knowledge consistently accepted as reliable by our courts, absent some new evidence calling that reliability into question." *Id*. at __, 560 S.E.2d at 240. Thus, in *Taylor*, where the principles underlying expert testimony on handwriting analysis had been repeatedly recognized as reliable and admissible, the trial court was not required to launch into a full analysis of the reliability of its underlying principles. *Id.*; *see also State v. Parks*, 147 N.C. App. 485, 556 S.E.2d 20, 24 (2001) (no abuse of discretion in admitting officer's expert testimony in fingerprint analysis where Supreme Court has already "recognized that fingerprinting is an established and scientifically reliable method of identification").

We observe that expert testimony in the field of accident reconstruction has been widely accepted as reliable by the courts of this State. *See*, *e.g.*, *Griffith v. McCall*, 114 N.C. App. 190, 194, 441 S.E.2d 570, 573 (1994) (upholding admission of accident reconstruction expert testimony to assist jury in understanding central issues and noting that it is the function of cross-examination to expose any weaknesses in the expert testimony); *State v. Purdie*, 93 N.C. App. 269, 276, 377 S.E.2d 789, 793 (1989)

(expert testimony on accident reconstruction admissible where based on expert's review of accident report, an interview with the investigating officer, photographs of the accident scene, and review of witness' testimony, because such information is that which is reasonably relied upon by experts in the field; where dispute existed over sequence of events, expert's testimony would clearly assist jury in interpreting physical evidence). Under our decision in *Taylor*, this alone sufficiently supports the admission of Trooper Hiatt's testimony, as defendant failed to set forth any new evidence calling the reliability of the methods of accident reconstruction into question.

In any event, we observe that Trooper Hiatt's testimony regarding his reconstruction methods and his analysis established a sufficient level of reliability to support the trial court's discretionary admission of his expert testimony. "Our Rules of Civil Procedure make clear that expert testimony may be based not only on scientific knowledge, but also on technical or other specialized knowledge not necessarily based in science." *Taylor*, __ N.C. App. at __, 560 S.E.2d at 239 (citing N.C. Gen. Stat. § 8C-1, Rule 702(a) (1999)). As we further stated in *Taylor*:

According to *Goode*, when faced with the proffer of expert testimony, the trial court must first "determine whether the expert is proposing to testify to scientific, technical, or other specialized knowledge that will assist the trier of fact to determine a fact in issue." This requires a preliminary assessment of whether the basis of the expert's testimony is "sufficiently valid and whether that reasoning or methodology can be properly applied to the facts in issue." In making this determination of reliability, our Supreme Court noted that our courts have focused on the following indicia of reliability: ". . . 'the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked "to sacrifice its independence by accepting [the] scientific hypotheses on faith," and

independent research conducted by the expert.'"

Id. at __, 560 S.E.2d at 239 (citations omitted). Here, Trooper Hiatt's testimony revealed that the techniques he employs in performing reconstructions are established techniques; he possesses extensive background in accident investigation and reconstruction; and he employed the use of several photographic exhibits to assist in illustrating his testimony for the jury. Defense counsel vigorously cross-examined Trooper Hiatt on his findings and conclusions. Although Trooper Hiatt did not testify as to any independent research that he has conducted in the area, there was evidence to support the trial court's ruling, and as such, we hold that it was not manifestly unsupported by reason or so arbitrary that it could not have been the result of a reasoned decision. *See Miller*, 142 N.C. App. at 444, 543 S.E.2d at 207. These arguments are therefore rejected.

Leatherwood v. Ehlinger, 151 N.C. App. 15, 564 S.E.2d 883, (2002).

Additionally, defendant argues a directed verdict was proper in that plaintiffs failed to provide sufficient evidence showing a causal link between his care and Amelia's injury. Specifically, he maintains Dr. Jones' conclusion that excessive lateral traction can cause a tearing of the C8-T1 nerve root in the brachial plexus is not supported by the relevant "medical literature."

At its core, defendant's argument raises the question of whether Dr. Jones' causation opinion was sufficiently reliable to be presented to the jury. It is a well established principle that unless an expert's testimony on the issue of medical causation is sufficiently reliable, it is not considered competent evidence and therefore should not be presented to the jury. *See Young v. Hickory Bus. Furn.*, 353 N.C. 227, 230, 538 S.E.2d 912, 915 (2000). "An expert is not competent to testify as to a causal relation which rests upon mere speculation or possibility." *Id.* (citations omitted). Whether scientific opinion evidence is sufficiently reliable and relevant is a matter entrusted to the sound discretion of the trial court. *State v. Spencer*, 119 N.C. App. 662, 664, 459 S.E.2d 812, 814, *disc. rev. denied*, 341 N.C. 655, 462 S.E.2d 524 (1995)(citations omitted).

Implicit in the rules governing the admissibility of an expert's opinion is a precondition that the matters or data upon which the expert bases his opinion be recognized as sufficiently reliable and relevant by the scientific community. *Id.* (*citing Daubert v. Merrell Dow*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993); *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984) and N.C. Gen. Stat. § 8C-1, Rule 703 (1992)). Further, our Supreme Court has identified several indices of reliability including: "the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith,' and independent research conducted by the expert." *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852-53 (1990); *see also State v. Berry*, 143 N.C. App. 187, 203-04, 546 S.E.2d 145, 157, *disc. rev. denied*, 353 N.C. 729, 551 S.E.2d 439 (2001).

Again, the record shows that Dr. Jones reviewed the medical records and deposition testimony. He based his opinion with respect to the cause of Amelia's injury on his training as an

obstetrician gynecologist and his extensive experience with shoulder dystocia emergencies and brachial plexus injuries. He testified that birth simulated studies using manikin and cadaver models support his conclusion that, if during delivery an obstetrician applies a downward level of traction involving excessive pressure, an injury to the C8-T1 area of the baby's brachial plexus could result. This testimony clearly demonstrates his opinion that Amelia's injury was causally linked to defendant's care, was based on more than mere speculation, and was sufficiently reliable to be submitted to the jury.

Moreover, "causation is an inference of fact to be drawn from other facts and circumstances." *Turner v. Duke University*, 325 N.C. 152, 162, 381 S.E.2d 706, 712 (1989)(*citing Hairston v. Alexander Tank & Equipment Co.*, 310 N.C. 227, 311 S.E.2d 559 (1984)). Accordingly, proximate cause is normally a question best answered by the jury. *Id.; see also Felts v. Liberty Emergency Service, P.A.*, 97 N.C. App. 381, 390, 388 S.E.2d 619, 624 (1990). Thus, we conclude plaintiffs presented sufficient evidence as to the proximate cause of Amelia's injury to overcome defendant's motion for a direct verdict.

For the reasons set forth above, we conclude that plaintiffs presented sufficient evidence to establish the applicable standard of care, a breach of the standard of care and proximate causation. Therefore, we hold the trial court improperly granted defendant's motion for a directed verdict. We reverse and remand the case for a new trial.

Whitfield v. Lab. Corp., 158 N.C. App. 341, 581 S.E.2d 778 (2003).

Defendants also argue that the Commission erred in its conclusion that plaintiff had proven a causal relationship between plaintiff's alleged symptoms and any compensable incident at work. As stated above, when reviewing the Commission's conclusions of law we must determine whether the findings of fact support the conclusions of law. However we review conclusions of law by the Commission *de novo*. *Hawley*, 146 N.C. App. at 427, 272 S.E.2d at 272.

The plaintiff in a workers' compensation case bears the burden of initially proving each and every element of compensability, including causation. *Porter v. Fieldcrest Cannon, Inc.*, 133 N.C. App. 23, 28, 514 S.E.2d 517, 521 (1999). "'Where the exact nature and probable genesis of a particular type of injury involves complicated medical questions far removed from the ordinary experience and knowledge of laymen, only an expert can give competent opinion evidence as to the cause of the injury.'" *Demery v. Converse, Inc.*, 138 N.C. App. 243, 248, 530 S.E.2d 871, 875 (2000) (quoting *Click v. Freight Carriers*, 300 N.C. 164, 167, 265 S.E.2d 389, 391 (1980)). "To establish the necessary causal relationship for the injury to be compensable under the Act, 'the evidence must be such as to take the case out of the realm of conjecture and remote possibility.'" *Id.* (quoting *Gilmore v. Board of Education*, 222 N.C. 358, 365, 23 S.E.2d 292, 296 (1942)).

The Commission found that:

> 27. Based on a description of the slip and fall that plaintiff experienced on June 5, 1998,

> Dr. Huh was of the opinion and the Full Commission finds that the types of problems he diagnosed for plaintiff were likely to have arisen from such a twisting fall.

This finding, if supported by the evidence, is sufficient to support the Commission's conclusion that plaintiff had shown a causal relationship between plaintiff's symptoms and the compensable accident that occurred on 5 June 1998. Such a finding takes the causal relationship out of the "realm of conjecture and remote possibility" as required. *Id.* We acknowledge that HN6 the "mere possibility of causation," as opposed to the "probability" of causation, is insufficient to support a finding of compensability. *Swink v. Cone Mills, Inc.*, 65 N.C. App. 397, 398, 309 S.E.2d 271, 271 (1983). However, this finding of fact speaks to the "probability," not the "possibility," of causation, and thus will support the conclusion of compensability if the finding of fact is supported by the evidence in the record. *See id.*

Dr. Huh testified in his deposition that, not only is it "possible," but that it is "likely" that plaintiff's near fall is the cause of her current pain. Dr. Huh also testified that he could say with a degree of "substantial certainty" that the fall on 5 June 1998 was the cause of plaintiff's back pain. Defendants argue that Dr. Huh had no basis for his opinion and his testimony was therefore inadmissible under (1) *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 590, 125 L. Ed. 2d 469, 481, 113 S. Ct. 2786 (1993), because it was not "grounded in the methods and procedures of science," and (2) under *Young*, 353 N.C. at 230, 538 S.E.2d at 915, because his testimony was entirely based on "mere speculation or possibility." Dr. Huh examined plaintiff several times over the period of more than a year and a half, he knew about the fall that occurred on 5 June 1998, and he diagnosed the injuries of which plaintiff complains. As we have already stated, Dr. Huh's deposition testimony is not speculative and it focuses on the probability, not simply the possibility, that the fall on 5 June 1998 caused plaintiff's injuries. Dr. Huh's testimony as to causation was competent and could be considered by the Commission. "The Commission's findings will not be disturbed on appeal if they are supported by competent evidence even if there is contrary evidence in the record." *Hawley*, 146 N.C. App. at 427, 552 S.E.2d at 272 (citing *Deese*, 352 N.C. 109, 530 S.E.2d 549 (2000) and *Peoples v. Cone Mills Corp.*, 316 N.C. 426, 432, 342 S.E.2d 798, 803 (1986)). Although there is contrary evidence in the record, we find that Dr. Huh's testimony was competent evidence to support the Commission's findings and its conclusion that plaintiff had shown a causal relationship between the fall on 5 June 1998 and the symptoms for which plaintiff seeks recovery. This argument is overruled.

Red Hill Hosiery Mill, Inc. v. Magnetek, Inc., 159 N.C. App. 135, 582 S.E.2d 632 (2003).

In their final assignment of error, defendants argue the trial court erred in allowing Dr. McKnight to testify over their objection, as an expert in the fields of electrical engineering and fire cause and origin investigations. We disagree.

Rule 702(a) of the North Carolina Rules of Evidence governs the admissibility of expert opinion and provides:

> (a) If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion.

The standards required by this Rule, expounded on in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993) and the North Carolina courts, *see, e.g.*, *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995), require the trial court to act as a "gatekeeper" and ensure that an expert's testimony is both relevant and reliable. In performing this function, the trial court is accorded substantial latitude, *Wiles v. N.C. Farm Bureau Mut. Ins. Co.*, 85 N.C. App. 162, 354 S.E.2d 248, *disc. review denied*, 320 N.C. 517, 358 S.E.2d 533 (1987), and its determination will be sustained absent an abuse of discretion. *State v. Holland*, 150 N.C. App. 457, 566 S.E.2d 90 (2002), *cert. denied*, 356 N.C. 685, 578 S.E.2d 316 (2003).

Here, Dr. McKnight testified that he has a Bachelor's and Master's Degree in Electrical Engineering and a Doctorate in Physics from Duke University. He has over 23 years' experience in the field of fire cause and origin investigation and has examined lighting fixture ballasts in the past. He has also been recognized as an expert by the courts on other occasions.

Given his educational background and expertise, we cannot conclude that the trial court abused its discretion in admitting his testimony. We believe the trial court properly exercised its "gatekeeping" function and that any deficiencies in Dr. McKnight's qualifications or knowledge could be properly tested by cross-examination, presentation of evidence to the contrary, and appropriate jury instruction. *See Powell v. Parker*, 62 N.C. App. 465, 303 S.E.2d 225, *disc. review denied*, 309 N.C. 322, 307 S.E.2d 166 (1983). Upon careful review of the record, transcript, and arguments presented by the parties, defendants' final assignment of error is overruled.

State v. Fair, 164 N.C. App. 770, 596 S.E.2d 871, (2004).

The scope of discovery sought by defendant in this case goes far beyond that allowed under *Cunningham* and *Dunn*. Defendant asserts in his brief:
[The State] did not, however, provide him with the discovery he requested of information regarding the procedures used in the tests; the data derived from the tests or *other materials pertinent to whether the techniques used have been tested; subjected to peer review and publication or submitted to the scrutiny of the scientific community.* Nor did the State provide the requested discovery of the technique's known or potential rates of error and *general acceptance in the scientific community*.

Defendant thus seeks to expand discovery in criminal cases to include articles and publications which would cast doubt upon the scientific validity of the testing procedure and form the basis of a challenge to the procedure under the rationale of *Daubert v. Merrell Dow*, 509 U.S. 579, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993).

Defendant is entitled to discover the results of the tests and the manner in which the tests were performed. This information is necessary for the defendant to understand the testing procedure and to conduct an effective cross-examination of the State's expert witness. *See* Dunn, 154 N.C. App. at 6, 571 S.E.2d at 654. However, it is beyond the scope of N.C. Gen. Stat. § 15A-903's discovery provisions to require the State to provide defendant with information concerning peer review of the testing procedure, whether the procedure has been submitted to the scrutiny of the scientific community, or is generally accepted in the scientific community. It is further beyond the scope of permitted discovery to require the State to produce citations to empirical studies supporting the opinion, or citations to articles in scientific treatises or journals supporting the opinion. This is information that is not under the control of the State, and is generally available in the scientific community.

Thus, the trial court erred in not requiring the State to provide discovery of data collection procedures requested by the defendant. Such information falls under laboratory protocol documents held discoverable under *Dunn*, without which defendant could not effectively cross-examine the State's expert witness. This error requires a new trial. Defendant brought forward no argument concerning the failure of the State to provide a curriculum vitae of the State's expert or any statistical analysis; therefore, these matters are not before us.

State v. McVay, 167 N.C. App. 588, 606 S.E.2d 145 (2004).

Defendant's single issue raised in this appeal alleges the trial court erred in allowing the State to present, as an expert, the testimony of Investigator French concerning the glass fragments found at the scene of the crime and in defendant's boot. Investigator French testified that the glass found at the point of broken entry at Morningside was "consistent" with that found in defendant's boot. For the reasons set forth below, we find this expert testimony was properly admitted by the court.

Defendant cites this Court's opinion in *Howerton v. Arai Helmet, Ltd.*, 158 N.C. App. 316, 581 S.E.2d 816, *disc. review allowed*, 357 N.C. 459, 585 S.E.2d 757 (2003), for his contention that North Carolina has adopted the federal standard for a trial court's discretionary ruling on the admissibility of expert testimony under N.C. Gen. Stat. § 8C-1, Rule 702 (2003) of the North Carolina Rules of Evidence ("Rule 702"). In setting the federal standard, the Supreme Court articulated a five-step inquiry a district court must consider to measure the reliability of scientific expert testimony. *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 594-95, 125 L. Ed. 2d 469, 483-84, 113 S. Ct. 2786 (1993). However, in its review of *Howerton*, our Supreme Court overruled this Court's blanket adoption of *Daubert*, holding that admissibility under Rule 702 has proven to be more liberal in North Carolina than that of the federal standard. *Howerton v. Arai Helmet, Ltd.*, 358 N.C. 440, 463, 597 S.E.2d 674, 689 (2004). Instead, our Supreme Court held that admissibility of expert testimony under North Carolina's Rule 702 is governed by the factors set out in *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995). *Howerton*, 358 N.C. at 458, 461 S.E.2d at 686-87.

Under Rule 702(a), in order for expert testimony to be admitted, the expert must be qualified by "knowledge, skill, experience, training, or education[.]"

The Supreme Court in *Howerton* reaffirmed the principle that "trial courts are afforded 'wide latitude of discretion when making a determination about the admissibility of expert testimony.'" *Id.* at 458, 597 S.E.2d at 687 (quoting *State v. Bullard*, 312 N.C. 129, 140, 322 S.E.2d 370, 376 (1984)). Thus, "a trial court's ruling on . . . the admissibility of an expert's opinion will not be reversed on appeal absent a showing of abuse of discretion." *Id.* An abuse of discretion occurs where a "'ruling is manifestly unsupported by reason or is so arbitrary that it could not have been the result of a reasoned decision.'" *State v. Miller*, 142 N.C. App. 435, 444, 543 S.E.2d 201, 207 (2001) (citations omitted). The Supreme Court in *Howerton* held that the standard framing the discretion of the trial court's admission of expert testimony is composed of the following three-step inquiry as established in *Goode*:

(1) Is the expert's proffered method of proof sufficiently reliable as an area for expert testimony? (2) Is the witness testifying at trial qualified as an expert in that area of testimony? (3) Is the expert's testimony relevant?

Howerton, 358 N.C. at 458, 597 S.E.2d at 686 (citations omitted); *see Goode*, 341 N.C. at 527-29, 461 S.E.2d at 640-41.

With respect to the first step of *Goode*, "initially, the trial court should look to precedent for guidance in determining whether the theoretical or technical methodology underlying an expert's opinion is reliable." *Howerton*, 358 N.C. at 459, 597 S.E.2d at 686. *Howerton* goes on to set out that if "the trial court is without precedential guidance or faced with novel scientific theories, unestablished techniques, or compelling new perspectives on otherwise settled theories or techniques," the trial court must look to other "'indices of reliability' to determine whether the expert's proffered scientific or technical method of proof is sufficiently reliable[.]" *Id.* at 460, 597 S.E.2d at 687 (quoting *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 853 (1990)). Such indices may include "the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith,' and independent research conducted by the expert." *Id.* (citations omitted).

In the case at bar, the trial court conducted *voir dire* examination to determine whether Investigator French was an expert and whether the substance of his testimony would be admissible. The trial court did not have any precedent before it to determine the reliability of the testing procedure conducted by Investigator French. Thus, the court heard evidence on indicia of the evidence's reliability. Investigator French's testimony revealed in detail his testing methods as performed under controlled circumstances. The standard for the tests was the broken glass samples taken from Morningside, and the unknown was the glass removed from defendant's boot. He first conducted a visual test comparing the glass samples for the following: any color coating or tinted sheet on the glass, if the glass was colored when it was made, the thickness of the glass, and if there was any texture to it. An ultraviolet test was taken for any fluoresces. He then tested the density of the glass in a test tube by varying the density of a solution in which the samples were placed. He then observed whether the standard and the unknown stayed suspended at the same level as each other in the varying densities of solution. And lastly, under a microscope, he tested and graphed the refractive indexes of the standard and the unknown by

heating the samples separately at various temperatures in an oil for which the refractive indexes at varying temperatures were known. Using the known index of the oil, Investigator French was able to compare the indexes of the standard and the unknown at different heats. Finding the standard and the unknown to be consistent, he stated that "[he] [could] not rule out that the particle did not come from that source."

We believe the extensive *voir dire* testimony of Investigator French was sufficient to support the trial court's discretionary determination to admit the evidence of the consistency of the glass samples pursuant to the reliability of the tests. This is true especially in light of Investigator French's professional qualifications, a factor supporting both the indicia of reliability of his tests *and* qualifying him as an expert for purposes of his testimony. *See below*. Finally, we find support in our determination in a previous decision of this Court, and decisions of other jurisdictions. In *State v. Bell*, 22 N.C. App. 348, 206 S.E.2d 356 (1974), the defendant contended that there was no evidence from which the jury could infer that defendant wrongfully broke or entered the building in question. *Id.* at 349, 206 S.E.2d at 357. We held the evidence was sufficient to survive a nonsuit of defendant's charges where, among other evidence, an expert "analysis of glass particles removed from defendant's clothing revealed they had the same refractive and density qualities as the glass found inside Little Hardware." *Id.* at 349, 206 S.E.2d at 357. Other jurisdictions have allowed similar testimony. *See also* *Wheeler v. State*, 255 Ind. 395, 400, 264 N.E.2d 600 (1970) (where the court allowed expert testimony to establish a strong likelihood that the sliver of glass found in defendant's shoe sole came from the broken eyeglasses belonging to the victim); *State v. Wright*, 619 S.W.2d 822, 823 (Mo. Ct. App. 1981) (where a glass shard found in defendant's trousers matched the refractive indexes and density of a piece of broken glass from the broken door, and could be used to show there was a reasonable possibility that the glass shard came from the same source as the glass from the scene).

In applying "the second step of analysis under *Goode*, the trial court must determine whether the witness is qualified as an expert in the subject area about which that individual intends to testify." *Howerton*, 358 N.C. at 461, 597 S.E.2d at 688. Relied on by the Court in *Howerton*, our Supreme Court set out the following standard for this determination in *State v. Goodwin*, 320 N.C. 147, 357 S.E.2d 639 (1987):

> Whether a witness has the requisite skill to qualify as an expert in a given area is chiefly a question of fact, the determination of which is ordinarily within the exclusive province of the trial court. Under N.C.G.S. § 8C-1, Rule 702 a witness may be qualified as an expert if the trial court finds that through "knowledge, skill, experience, training, or education" the witness has acquired such skill that he or she is better qualified than the jury to form an opinion on the particular subject.

Id. at 150-51, 357 S.E.2d at 641.

At the time of trial, Investigator French had an extensive background in trace evidence. He had been employed by the Charlotte Mecklenburg Police Department as a criminalist for approximately five years, and prior to that by the Syracuse, New York Police Department crime lab as a forensic chemist for nine years. His duties as a criminalist included testing and analyzing trace evidence such as hair, fiber, paint, glass, gunshot residue, tape, cordage, and match

filaments. He received a bachelor's degree in chemistry and biology. Relating to trace evidence, he received internal training at two police departments and external training at the FBI Academy at Quantico and Brunswick College. Relating specifically to glass, he has performed several hundred tests for glass analysis during his career; he conducted a research project and made a presentation concerning conventional glass analysis versus elemental analysis to the American Academy of Forensic Scientists. In light of Investigator French's clear expertise in the area of trace evidence, and his experience in glass analysis, we cannot say the trial court abused its discretion in finding Investigator French to be more qualified to formulate an opinion on trace glass evidence than the jury. Additionally, we note that during the *voir dire* examination, defendant stated the following:

> I believe that - I mean, it sounds that - from what Mr. French testified, this is a commonly used process to compare glass. I don't know if I have much argument about whether or not he is an expert. I think I do have a good argument about whether this evidence is more prejudicial than probative of the defendant's guilt.

Finally, pursuant to the third step in ***Goode***, defendant made no argument as to whether this evidence, if otherwise admissible, was relevant. We hold that it was.

After close review of the record and the briefs, we conclude defendant received a trial free from reversible error.

State v. Anderson, 175 N.C. App. 444, 624 S.E.2d 393 *(2006)*

The Court of Appeals rejected defendant's assignment of error based upon *Daubert*, applying the standard set forth in Arai Helmet. Defendant challenged the State's expert ballistics testimony. "Our Supreme Court has previously upheld the admission of similar firearms or ballistics testimony. *See* ***State v. Gainey***, 355 N.C. 73, 88-89, 558 S.E.2d 463, 473-74 (holding that the trial court did not err in admitting testimony of SBI agent regarding rifling characteristics of particular bullets based on his experience and the fact that he had tested the bullets upon which he based his opinion), *cert. denied*, 537 U.S. 896, 154 L. Ed. 2d 165, 123 S. Ct. 182 (2002); ***State v. Felton***, 330 N.C. 619, 638, 412 S.E.2d 344, 356 (1992) (upholding admissibility of SBI agent's testimony regarding rifling characteristics of particular bullets). Defendant does not address this precedent, but rather argues that the State did not meet its burden because "[t]he State presented no evidence substantiating the scientific validity" of Agent Powell's comparisons of the bullets and the gun. As ***Howerton*** and ***Morgan*** establish, however, the State was not necessarily required to do so.

In challenging Agent Powell's methodology at trial, defendant did not offer any expert testimony or scientific literature. On appeal, however, defendant relies upon a series of journal articles that he contends establish that Agent Powell improperly failed to use photographs to document her work and that her methodology failed to comply with accepted scientific methods. Those articles were not, however, presented to the trial judge. A defendant cannot establish an abuse of discretion by the trial judge based on scientific literature never provided to that judge.

Defendant's literature review thus does not demonstrate that the trial judge abused his discretion in making his preliminary determination that Agent Powell's testimony was sufficiently reliable to meet the requirements of Rule 702 of the Rules of Evidence.

Lane v. Am. Nat'l Can Co., 181 N.C. App. 527, *640 S.E.2d 732, (2007).*

A review of the records and briefs clearly shows that plaintiff's contentions on appeal only challenge the methodology of Dr. Artigues' opinion which goes to the weight of her testimony and not the admissibility, and this Court will not address such issues. *Howerton*, 358 N.C. at 461, 597 S.E.2d at 688 (holding that once an expert has passed Rule 702's threshold of admissibility, "lingering questions or controversy concerning the quality of the expert's conclusions go to the weight of the testimony rather than its admissibility"). Our Supreme Court clearly stated in *Howerton* that North Carolina does not apply the gatekeeping function articulated by *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993), but rather leaves the duty of weighing the credibility of the expert testimony to the trier of fact. *See id.* This assignment of error is overruled.

Day v. Brant, ___ N.C.App. ___, 721 S.E.2d 238, (2012).

Instead of challenging the admissibility of Dr. Wyatt's testimony, defendants, at trial and on appeal, have challenged the sufficiency of Dr. Wyatt's testimony to establish causation. Our Supreme Court in *Holley v. ACTS, Inc.*, 357 N.C. 228, 232, 581 S.E.2d 750, 753 (2003), warned that the standards for admissibility of expert opinion testimony have been confused with the standards for sufficiency of such testimony." Expert testimony as to causation "is admissible if helpful to the jury," although it may be "insufficient to prove causation, particularly 'when there is additional evidence or testimony showing the expert's opinion to be a guess or mere speculation.'" *Id.* at 233, 581 S.E.2d at 753 (quoting *Young*, 353 N.C. at 233, 538 S.E.2d at 916). Defendants' argument on appeal perpetuates this confusion by failing to distinguish between the standard of review for admissibility and the standard of review for the sufficiency of the evidence.

Our Supreme Court, in *Howerton*, cautioned against the merging of the two issues. After rejecting the federal *Daubert* standard for evaluating the admissibility of expert testimony, the Court emphasized its "concern[] that trial courts asserting sweeping pre-trial 'gatekeeping' authority under *Daubert* [regarding the admissibility of expert testimony] may unnecessarily encroach upon the constitutionally-mandated function of the jury to decide issues of fact and to assess the weight of the evidence." *Howerton*, 358 N.C. at 468, 597 S.E.2d at 692.

More recently, the Supreme Court underscored, in the medical malpractice context, *Howerton*'s desire to ensure that preliminary questions of admissibility not intrude upon the right to trial by jury:

> We emphasized [in *Howerton*], on the other hand, that [HN13] the trial court's preliminary assessment should not "go so far as to require the expert's testimony to be proven conclusively reliable or indisputably valid before it can be admitted into evidence." [*Howerton*, 358 N.C.] at 460, 597 S.E.2d at 687. Evidence may be "shaky but admissible," and it is the role of the jury to make any final determination regarding the weight to be afforded to the evidence. *Id.* at 460-61, 597 S.E.2d at 687-88 (quoting *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 596, 125 L. Ed. 2d 469, 484, 113 S. Ct. 2786, 2798 (1993)).

Crocker v. Roethling, 363 N.C. 140, 149-50, 675 S.E.2d 625, 632 (2009) (Martin, J., concurring). The Court further pointed to "the emphasis *Howerton* places on the jury's role in evaluating expert testimony" and concluded that procedures must be adopted with an eye towards "protecting the jury from unreliable expert testimony yet preserving the jury's role in weighing the credibility of expert testimony when appropriate." *Id.* at 153, 675 S.E.2d at 634-35. Even the dissent in *Crocker* recognized that *Howerton* called on the trial court, when "determining whether an expert's testimony is sufficiently reliable for admission," to make "'a preliminary, foundational inquiry into the basic methodological adequacy of [the] expert testimony.'" *Id.* at 157, 675 S.E.2d at 637 (quoting *Howerton*, 358 N.C. at 460, 597 S.E.2d at 687).

In this appeal, no issue exists regarding any preliminary foundational inquiry into the basic methodological adequacy of Dr. Wyatt's testimony or his qualifications to testify. *Howerton* is immaterial, as is its standard of review. Instead, the proper standard of review is the one applicable to decisions at trial regarding the sufficiency of the evidence to take plaintiff's case to the jury — the directed verdict standard.

This conclusion is consistent with this Court's decision in *Weaver v. Sheppa*, 186 N.C. App. 412, 651 S.E.2d 395 (2007), *aff'd per curiam by an equally divided court*, 362 N.C. 341, 661 S.E.2d 733 (2008), a medical malpractice appeal in which the Court reversed the trial court's grant of judgment notwithstanding the verdict ("JNOV"). After noting that "[b]ecause causation is, in essence, a factual inference to be garnered from attendant facts and circumstances, it is a question generally best answered by a jury," the Court acknowledged — as defendants argue here — that "expert testimony based merely on speculation and conjecture 'is not sufficiently reliable to qualify **[**27]** as competent evidence on issues of medical causation.'" *Id.* at 416, 651 S.E.2d at 398 (quoting *Young*, 353 N.C. at 230, 538 S.E.2d at 915).

However, the Court further stressed that "when the challenged expert testimony relates to *causation* such admitted testimony is competent 'as long as the testimony is helpful to the jury and based sufficiently on information reasonably relied upon under Rule 703[.]'" *Id.* at 416-17, 651 S.E.2d at 399 (quoting *Johnson v. Piggly Wiggly of Pinetops, Inc.*, 156 N.C. App. 42, 49, 575 S.E.2d 797, 802 (2003)). The Court then proceeded to review the sufficiency of the expert testimony of causation under the traditional standard of review applicable to decisions granting JNOV. *Id.* at 417, 651 S.E.2d at 399 ("After a careful review of the record on appeal, we conclude that plaintiffs presented more than a scintilla of evidence supporting the proximate causation element of their medical negligence action."). Consequently, in this case, we apply the

standard of review applicable to directed verdicts and not the *Howerton* abuse of discretion standard urged by defendants.

SELECTED REFERENCE MATERIALS FOR DAUBERT

Beecher-Monas, Erica, *Blinded by Science: How Judges Avoid the Science in Scientific Evidence,* 71 Temp. L. Rev. 55 (1998).

Berger, Margaret A., *Procedural Paradigms for Applying the Daubert Test,* 78 Minn. L. Rev. 1345 (1994).

Cheng, Edward K., and Albert H. Yoon, *Does Frye or Daubert Matter? A Study of Scientific Admissibility Standards,* 91 Va. L. Rev. 471 (2005).

Dixon, Lloyd and Brian Gill, *Changes in the Standards for Admitting Expert Evidence in Federal Civil Cases since the Daubert Decision, RAND Inst. For Civil Justice (2001).*

Gagen, Andrew B., *What is an Environmental Expert? The Impact of Daubert, Joiner and Kuhmo Tire on the Admissibility of Scientific Expert Evidence,* 19 UCLA J. Envtl. L. & Pol'y 401 (2001-2002).

Gavin, Sandra F., *Managerial Justice in a Post-Daubert World: A Reliability Paradigm,* 234 F.R.D. 196 (May 2006).

Jensen, Pamela J., *Frye Versus Daubert: Practically the Same?,* 87 Minn. L. Rev. 1579 (2003).

Mangrum, Richard Collin, *Kumho Tire Company: The Expansion of the Court's Role in Screening Every Aspect of Every Expert's Testimony at Every Stage of the Proceedings,* 33 Creighton L. Rev. 525 (2000).

Nagareda, Richard A., *1938 All Over Again? Pretrial as Trial in Complex Litigation,* 60 DePaul L. Rev. 647 (2011).

National Research Council of the National Academies, *Strengthening Forensic Science in the United States: A Path Forward,* The National Academies Press (2009).

Risinger, D. Michael, *Navigating Expert Reliability: Are Criminal Standards of Certainty Being Left on the Dock?,* 64 Alb. L. Rev. 99 (2000).

Studebaker, Christina, *et al, Judge and Attorney Experiences, Practices, and Concerns Regarding Expert Testimony in Federal Civil Trials,* 8 Psychol. Pub. Pol'y & L. 309 (2002).

Vickers, A. Leah, *Daubert, Critique and Interpretation: What Empirical Studies Tell Us About the Application of Daubert,* 40 U.S.F. L. Rev. 109 (2005).

Widenhouse, M. Gordon, Jr., C*hanges to Rule 702(a): Has North Carolina codified Daubert and Does It Matter?,* Trial Briefs, April 2012, at 9.

509 U.S. 579 (1993)

DAUBERT et ux., individually and as guardians AD LITEM FOR DAUBERT, et al.
v.
MERRELL DOW PHARMACEUTICALS, INC.
No. 92-102.

United States Supreme Court.

Argued March 30, 1993.
Decided June 28, 1993.

CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

580*580 Blackmun, J., delivered the opinion for a unanimous Court with respect to Parts I and II—A, and the opinion of the Court with respect to Parts II—B, II—C, III, and IV, in which White, O'Connor, Scalia, Kennedy, Souter, and Thomas, JJ., joined. Rehnquist, C. J., filed an opinion concurring in part and dissenting in part, in which Stevens, J., joined, *post,* p. 598.

581*581 *Michael H. Gottesman* argued the cause for petitioners. With him on the briefs were *Kenneth J. Chesebro, Barry J. Nace, David L. Shapiro,* and *Mary G. Gillick.*

Charles Fried argued the cause for respondent. With him on the brief were *Charles R. Nesson, Joel I. Klein, Richard G. Taranto, Hall R. Marston, George E. Berry, Edward H. Stratemeier,* and *W. Glenn Forrester.*[*]

582*582 Justice Blackmun, delivered the opinion of the Court.

In this case we are called upon to determine the standard for admitting expert scientific testimony in a federal trial.

I

Petitioners Jason Daubert and Eric Schuller are minor children born with serious birth defects. They and their parents sued respondent in California state court, alleging that the birth defects had been caused by the mothers' ingestion of Bendectin, a prescription antinausea drug marketed by respondent. Respondent removed the suits to federal court on diversity grounds.

After extensive discovery, respondent moved for summary judgment, contending that Bendectin does not cause birth defects in humans and that petitioners would be unable to come forward with any admissible evidence that it does. In support of its motion, respondent submitted an affidavit of Steven H. Lamm, physician and epidemiologist, who is a well-credentialed expert on the risks from exposure to various chemical substances.[1] Doctor Lamm stated that he had

reviewed all the literature on Bendectin and human birth defects—more than 30 published studies involving over 130,000 patients. No study had found Bendectin to be a human teratogen (*i. e.*, a substance capable of causing malformations in fetuses). On the basis of this review, Doctor Lamm concluded that maternal use of Bendectin during the first trimester of pregnancy has not been shown to be a risk factor for human birth defects.

583*583 Petitioners did not (and do not) contest this characterization of the published record regarding Bendectin. Instead, they responded to respondent's motion with the testimony of eight experts of their own, each of whom also possessed impressive credentials.[2] These experts had concluded that Bendectin can cause birth defects. Their conclusions were based upon "in vitro" (test tube) and "in vivo" (live) animal studies that found a link between Bendectin and malformations; pharmacological studies of the chemical structure of Bendectin that purported to show similarities between the structure of the drug and that of other substances known to cause birth defects; and the "reanalysis" of previously published epidemiological (human statistical) studies.

The District Court granted respondent's motion for summary judgment. The court stated that scientific evidence is admissible only if the principle upon which it is based is "`sufficiently established to have general acceptance in the field to which it belongs.' " 727 F. Supp. 570, 572 (SD Cal. 1989), quoting *United States* v. *Kilgus*, 571 F. 2d 508, 510 (CA9 1978). The court concluded that petitioners' evidence did not meet this standard. Given the vast body of epidemiological data concerning Bendectin, the court held, expert opinion which is not based on epidemiological evidence 584*584 is not admissible to establish causation. 727 F. Supp., at 575. Thus, the animal-cell studies, live-animal studies, and chemical-structure analyses on which petitioners had relied could not raise by themselves a reasonably disputable jury issue regarding causation. *Ibid.* Petitioners' epidemiological analyses, based as they were on recalculations of data in previously published studies that had found no causal link between the drug and birth defects, were ruled to be inadmissible because they had not been published or subjected to peer review. *Ibid.*

The United States Court of Appeals for the Ninth Circuit affirmed. 951 F. 2d 1128 (1991). Citing *Frye* v. *United States*, 54 App. D. C. 46, 47, 293 F. 1013, 1014 (1923), the court stated that expert opinion based on a scientific technique is inadmissible unless the technique is "generally accepted" as reliable in the relevant scientific community. 951 F. 2d, at 1129-1130. The court declared that expert opinion based on a methodology that diverges "significantly from the procedures accepted by recognized authorities in the field . . . cannot be shown to be `generally accepted as a reliable technique.' " *Id.*, at 1130, quoting *United States* v. *Solomon*, 753 F. 2d 1522, 1526 (CA9 1985).

The court emphasized that other Courts of Appeals considering the risks of Bendectin had refused to admit reanalyses of epidemiological studies that had been neither published nor subjected to peer review. 951 F. 2d, at 1130-1131. Those courts had found unpublished reanalyses "particularly problematic in light of the massive weight of the original published studies supporting [respondent's] position, all of which had undergone full scrutiny from the scientific community." *Id.*, at 1130. Contending that reanalysis is generally accepted by the scientific community only when it is subjected to verification and scrutiny by others in the field,

the Court of Appeals rejected petitioners' reanalyses as "unpublished, not subjected to the normal peer review process and generated solely for use in litigation." *Id.*, at 1131. The 585*585 court concluded that petitioners' evidence provided an insufficient foundation to allow admission of expert testimony that Bendectin caused their injuries and, accordingly, that petitioners could not satisfy their burden of proving causation at trial.

We granted certiorari, 506 U. S. 914 (1992), in light of sharp divisions among the courts regarding the proper standard for the admission of expert testimony. Compare, *e. g.*, *United States* v. *Shorter*, 257 U. S. App. D. C. 358, 363— 364, 809 F. 2d 54, 59-60 (applying the "general acceptance" standard), cert. denied, 484 U. S. 817 (1987), with *DeLuca* v. *Merrell Dow Pharmaceuticals, Inc.*, 911 F. 2d 941, 955 (CA3 1990) (rejecting the "general acceptance" standard).

II

A

In the 70 years since its formulation in the *Frye* case, the "general acceptance" test has been the dominant standard for determining the admissibility of novel scientific evidence at trial. See E. Green & C. Nesson, Problems, Cases, and Materials on Evidence 649 (1983). Although under increasing attack of late, the rule continues to be followed by a majority of courts, including the Ninth Circuit.[3]

The *Frye* test has its origin in a short and citation-free 1923 decision concerning the admissibility of evidence derived from a systolic blood pressure deception test, a crude precursor to the polygraph machine. In what has become a famous (perhaps infamous) passage, the then Court of Appeals for the District of Columbia described the device and its operation and declared:

"Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages 586*586 is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, *the thing from which the deduc- tion is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.* " 54 App. D. C., at 47, 293 F., at 1014 (emphasis added).

Because the deception test had "not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made," evidence of its results was ruled inadmissible. *Ibid.*

The merits of the *Frye* test have been much debated, and scholarship on its proper scope and application is legion.[4] 587*587 Petitioners' primary attack, however, is not on the content but on the continuing authority of the rule. They contend that the *Frye* test was superseded by the adoption of the Federal Rules of Evidence.[5] We agree.

We interpret the legislatively enacted Federal Rules of Evidence as we would any statute. *Beech Aircraft Corp.* v. *Rainey*, 488 U. S. 153, 163 (1988). Rule 402 provides the baseline:

"All relevant evidence is admissible, except as otherwise provided by the Constitution of the United States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority. Evidence which is not relevant is not admissible."

"Relevant evidence" is defined as that which has "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." Rule 401. The Rules' basic standard of relevance thus is a liberal one.

Frye, of course, predated the Rules by half a century. In *United States* v. *Abel*, 469 U. S. 45 (1984), we considered the pertinence of background common law in interpreting the Rules of Evidence. We noted that the Rules occupy the field, *id.*, at 49, but, quoting Professor Cleary, the Reporter, 588*588 explained that the common law nevertheless could serve as an aid to their application:

"`In principle, under the Federal Rules no common law of evidence remains. "All relevant evidence is admissible, except as otherwise provided . . . ." In reality, of course, the body of common law knowledge continues to exist, though in the somewhat altered form of a source of guidance in the exercise of delegated powers.' " *Id.*, at 51-52.

We found the common-law precept at issue in the *Abel* case entirely consistent with Rule 402's general requirement of admissibility, and considered it unlikely that the drafters had intended to change the rule. *Id.*, at 50-51. In *Bourjaily* v. *United States*, 483 U. S. 171 (1987), on the other hand, the Court was unable to find a particular common-law doctrine in the Rules, and so held it superseded.

Here there is a specific Rule that speaks to the contested issue. Rule 702, governing expert testimony, provides:

"If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."

Nothing in the text of this Rule establishes "general acceptance" as an absolute prerequisite to admissibility. Nor does respondent present any clear indication that Rule 702 or the Rules as a whole were intended to incorporate a "general acceptance" standard. The drafting history makes no mention of *Frye*, and a rigid "general acceptance" requirement would be at odds with the "liberal thrust" of the Federal Rules and their "general approach of relaxing the traditional barriers to `opinion' testimony." *Beech Aircraft Corp.* v. *Rainey*, 488 U. S., at 169 (citing Rules 701 to 705). See also Weinstein, Rule 702 of the Federal Rules of Evidence is 589*589 Sound; It Should Not Be Amended, 138 F. R. D. 631 (1991) ("The Rules were designed to depend primarily upon lawyer-adversaries and sensible triers of fact to evaluate conflicts"). Given the Rules' permissive backdrop and their inclusion of a specific rule on expert testimony that does

not mention "general acceptance," the assertion that the Rules somehow assimilated *Frye* is unconvincing. *Frye* made "general acceptance" the exclusive test for admitting expert scientific testimony. That austere standard, absent from, and incompatible with, the Federal Rules of Evidence, should not be applied in federal trials.[6]

B

That the *Frye* test was displaced by the Rules of Evidence does not mean, however, that the Rules themselves place no limits on the admissibility of purportedly scientific evidence.[7] Nor is the trial judge disabled from screening such evidence. To the contrary, under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.

The primary locus of this obligation is Rule 702, which clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify. "*If scientific,* technical, or other specialized *knowledge will assist the trier of fact* to understand the evidence or to determine a fact in issue" an expert "may testify *thereto.* " (Emphasis added.) The subject of an expert's testimony must 590*590 be "scientific .. . knowledge."[8] The adjective "scientific" implies a grounding in the methods and procedures of science. Similarly, the word "knowledge" connotes more than subjective belief or unsupported speculation. The term "applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds." Webster's Third New International Dictionary 1252 (1986). Of course, it would be unreasonable to conclude that the subject of scientific testimony must be "known" to a certainty; arguably, there are no certainties in science. See, *e. g.*, Brief for Nicolaas Bloembergen et al. as *Amici Curiae* 9 ("Indeed, scientists do not assert that they know what is immutably `true'—they are committed to searching for new, temporary, theories to explain, as best they can, phenomena"); Brief for American Association for the Advancement of Science et al. as *Amici Curiae* 7-8 ("Science is not an encyclopedic body of knowledge about the universe. Instead, it represents a *process* for proposing and refining theoretical explanations about the world that are subject to further testing and refinement" (emphasis in original)). But, in order to qualify as "scientific knowledge," an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation—*i. e.,* "good grounds," based on what is known. In short, the requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.[9]

591*591 Rule 702 further requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." This condition goes primarily to relevance. "Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful." 3 Weinstein & Berger ¶ 702[02], p. 702-18. See also *United States* v. *Downing*, 753 F. 2d 1224, 1242 (CA3 1985) ("An additional consideration under Rule 702—and another aspect of relevancy—is whether expert testimony proffered in the case is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute"). The consideration has been aptly described by Judge Becker as one of "fit." *Ibid.* "Fit" is not always obvious, and scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes. See Starrs, *Frye v. United States* Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702, 26 Jurimetrics J. 249, 258 (1986). The study of the phases of the

moon, for example, may provide valid scientific "knowledge" about whether a certain night was dark, and if darkness is a fact in issue, the knowledge will assist the trier of fact. However (absent creditable grounds supporting such a link), evidence that the moon was full on a certain night will not assist the trier of fact in determining whether an individual was unusually likely to have behaved irrationally on that night. Rule 702's "helpfulness" 592*592 standard requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility.

That these requirements are embodied in Rule 702 is not surprising. Unlike an ordinary witness, see Rule 701, an expert is permitted wide latitude to offer opinions, including those that are not based on firsthand knowledge or observation. See Rules 702 and 703. Presumably, this relaxation of the usual requirement of firsthand knowledge—a rule which represents "a `most pervasive manifestation' of the common law insistence upon `the most reliable sources of information,' " Advisory Committee's Notes on Fed. Rule Evid. 602, 28 U. S. C. App., p. 755 (citation omitted)—is premised on an assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline.

C

Faced with a proffer of expert scientific testimony, then, the trial judge must determine at the outset, pursuant to Rule 104(a),[10] whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue.[11] This entails a preliminary assessment of whether the reasoning or methodology 593*593 underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue. We are confident that federal judges possess the capacity to undertake this review. Many factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test. But some general observations are appropriate.

Ordinarily, a key question to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact will be whether it can be (and has been) tested. "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry." Green 645. See also C. Hempel, Philosophy of Natural Science 49 (1966) ("[T]he statements constituting a scientific explanation must be capable of empirical test"); K. Popper, Conjectures and Refutations: The Growth of Scientific Knowledge 37 (5th ed. 1989) ("[T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability") (emphasis deleted).

Another pertinent consideration is whether the theory or technique has been subjected to peer review and publication. Publication (which is but one element of peer review) is not a *sine qua non* of admissibility; it does not necessarily correlate with reliability, see S. Jasanoff, The Fifth Branch: Science Advisors as Policymakers 61-76 (1990), and in some instances well-grounded but innovative theories will not have been published, see Horrobin, The Philosophical Basis of Peer Review and the Suppression of Innovation, 263 JAMA 1438 (1990). Some propositions, moreover, are too particular, too new, or of too limited interest to be published. But submission to the scrutiny of the scientific community is a component of "good science," in part because it increases the likelihood that substantive flaws in methodology will be detected. See J. Ziman,

Reliable Knowledge: An Exploration 594*594 of the Grounds for Belief in Science 130-133 (1978); Relman & Angell, How Good Is Peer Review?, 321 New Eng. J. Med. 827 (1989). The fact of publication (or lack thereof) in a peer reviewed journal thus will be a relevant, though not dispositive, consideration in assessing the scientific validity of a particular technique or methodology on which an opinion is premised.

Additionally, in the case of a particular scientific technique, the court ordinarily should consider the known or potential rate of error, see, *e. g.*, *United States* v. *Smith*, 869 F. 2d 348, 353-354 (CA7 1989) (surveying studies of the error rate of spectrographic voice identification technique), and the existence and maintenance of standards controlling the technique's operation, see *United States* v. *Williams*, 583 F. 2d 1194, 1198 (CA2 1978) (noting professional organization's standard governing spectrographic analysis), cert. denied, 439 U. S. 1117 (1979).

Finally, "general acceptance" can yet have a bearing on the inquiry. A "reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community." *United States* v. *Downing*, 753 F. 2d, at 1238. See also 3 Weinstein & Berger ¶ 702[03], pp. 702-41 to 702-42. Widespread acceptance can be an important factor in ruling particular evidence admissible, and "a known technique which has been able to attract only minimal support within the community," *Downing*, 753 F. 2d, at 1238, may properly be viewed with skepticism.

The inquiry envisioned by Rule 702 is, we emphasize, a flexible one.[12] Its overarching subject is the scientific validity—and 595*595 thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate.

Throughout, a judge assessing a proffer of expert scientific testimony under Rule 702 should also be mindful of other applicable rules. Rule 703 provides that expert opinions based on otherwise inadmissible hearsay are to be admitted only if the facts or data are "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject." Rule 706 allows the court at its discretion to procure the assistance of an expert of its own choosing. Finally, Rule 403 permits the exclusion of relevant evidence "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury . . . ." Judge Weinstein has explained: "Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 of the present rules exercises more control over experts than over lay witnesses." Weinstein, 138 F. R. D., at 632.

III

We conclude by briefly addressing what appear to be two underlying concerns of the parties and *amici* in this case. Respondent expresses apprehension that abandonment of "general acceptance" as the exclusive requirement for admission will result in a "free-for-all" in which befuddled juries are confounded by absurd and irrational pseudoscientific assertions. 596*596 In this regard respondent seems to us to be overly pessimistic about the capabilities of the jury and of the

adversary system generally. Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence. See *Rock* v. *Arkansas*, 483 U. S. 44, 61 (1987). Additionally, in the event the trial court concludes that the scintilla of evidence presented supporting a position is insufficient to allow a reasonable juror to conclude that the position more likely than not is true, the court remains free to direct a judgment, Fed. Rule Civ. Proc. 50(a), and likewise to grant summary judgment, Fed. Rule Civ. Proc. 56. Cf., *e. g., Turpin* v. *Merrell Dow Pharmaceuticals, Inc.*, 959 F. 2d 1349 (CA6) (holding that scientific evidence that provided foundation for expert testimony, viewed in the light most favorable to plaintiffs, was not sufficient to allow a jury to find it more probable than not that defendant caused plaintiff's injury), cert. denied, 506 U. S. 826 (1992); *Brock* v. *Merrell Dow Pharmaceuticals, Inc.*, 874 F. 2d 307 (CA5 1989) (reversing judgment entered on jury verdict for plaintiffs because evidence regarding causation was insufficient), modified, 884 F. 2d 166 (CA5 1989), cert. denied, 494 U. S. 1046 (1990); Green 680-681. These conventional devices, rather than wholesale exclusion under an uncompromising "general acceptance" test, are the appropriate safeguards where the basis of scientific testimony meets the standards of Rule 702.

Petitioners and, to a greater extent, their *amici* exhibit a different concern. They suggest that recognition of a screening role for the judge that allows for the exclusion of "invalid" evidence will sanction a stifling and repressive scientific orthodoxy and will be inimical to the search for truth. See, *e. g.,* Brief for Ronald Bayer et al. as *Amici Curiae.* It is true that open debate is an essential part of both legal and scientific analyses. Yet there are important differences between the quest for truth in the courtroom and the quest 597*597 for truth in the laboratory. Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are incorrect will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final, and binding legal judgment—often of great consequence—about a particular set of events in the past. We recognize that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations. That, nevertheless, is the balance that is struck by Rules of Evidence designed not for the exhaustive search for cosmic understanding but for the particularized resolution of legal disputes.[13]

IV

To summarize: "General acceptance" is not a necessary precondition to the admissibility of scientific evidence under the Federal Rules of Evidence, but the Rules of Evidence— especially Rule 702—do assign to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand. Pertinent evidence based on scientifically valid principles will satisfy those demands.

The inquiries of the District Court and the Court of Appeals focused almost exclusively on "general acceptance," as gauged by publication and the decisions of other courts. Accordingly, 598*598 the judgment of the Court of Appeals is vacated, and the case is remanded for further proceedings consistent with this opinion.

It is so ordered.

Chief Justice Rehnquist, with whom Justice Stevens joins, concurring in part and dissenting in part.

The petition for certiorari in this case presents two questions: first, whether the rule of *Frye* v. *United States*, 54 App. D. C. 46, 293 F. 1013 (1923), remains good law after the enactment of the Federal Rules of Evidence; and second, if *Frye* remains valid, whether it requires expert scientific testimony to have been subjected to a peer review process in order to be admissible. The Court concludes, correctly in my view, that the *Frye* rule did not survive the enactment of the Federal Rules of Evidence, and I therefore join Parts I and II—A of its opinion. The second question presented in the petition for certiorari necessarily is mooted by this holding, but the Court nonetheless proceeds to construe Rules 702 and 703 very much in the abstract, and then offers some "general observations." *Ante,* at 593.

"General observations" by this Court customarily carry great weight with lower federal courts, but the ones offered here suffer from the flaw common to most such observations—they are not applied to deciding whether particular testimony was or was not admissible, and therefore they tend to be not only general, but vague and abstract. This is particularly unfortunate in a case such as this, where the ultimate legal question depends on an appreciation of one or more bodies of knowledge not judicially noticeable, and subject to different interpretations in the briefs of the parties and their *amici.* Twenty-two *amicus* briefs have been filed in the case, and indeed the Court's opinion contains no fewer than 37 citations to *amicus* briefs and other secondary sources.

599*599 The various briefs filed in this case are markedly different from typical briefs, in that large parts of them do not deal with decided cases or statutory language—the sort of material we customarily interpret. Instead, they deal with definitions of scientific knowledge, scientific method, scientific validity, and peer review—in short, matters far afield from the expertise of judges. This is not to say that such materials are not useful or even necessary in deciding how Rule 702 should be applied; but it is to say that the unusual subject matter should cause us to proceed with great caution in deciding more than we have to, because our reach can so easily exceed our grasp.

But even if it were desirable to make "general observations" not necessary to decide the questions presented, I cannot subscribe to some of the observations made by the Court. In Part II—B, the Court concludes that reliability and relevancy are the touchstones of the admissibility of expert testimony. *Ante,* at 590-592. Federal Rule of Evidence 402 provides, as the Court points out, that "[e]vidence which is not relevant is not admissible." But there is no similar reference in the Rule to "reliability." The Court constructs its argument by parsing the language "[i]f scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, . . . an expert . . . may testify thereto . . . ." Fed. Rule Evid. 702. It stresses that the subject of the expert's testimony must be "scientific . . . knowledge," and points out that "scientific" "implies a grounding in the methods and procedures of science" and that the word "knowledge" "connotes more than subjective belief or unsupported speculation." *Ante,* at 590. From this it concludes that "scientific knowledge" must be "derived by the scientific method." *Ibid.* Proposed testimony, we are told, must be supported by

"appropriate validation." *Ibid.* Indeed, in footnote 9, the Court decides that "[i]n a case involving scientific evidence, *evidentiary* 600*600 *reliability* will be based upon *scientific validity.* " *Ante,* at 591, n. 9 (emphasis in original).

Questions arise simply from reading this part of the Court's opinion, and countless more questions will surely arise when hundreds of district judges try to apply its teaching to particular offers of expert testimony. Does all of this *dicta* apply to an expert seeking to testify on the basis of "technical or other specialized knowledge"—the other types of expert knowledge to which Rule 702 applies—or are the "general observations" limited only to "scientific knowledge"? What is the difference between scientific knowledge and technical knowledge; does Rule 702 actually contemplate that the phrase "scientific, technical, or other specialized knowledge" be broken down into numerous subspecies of expertise, or did its authors simply pick general descriptive language covering the sort of expert testimony which courts have customarily received? The Court speaks of its confidence that federal judges can make a "preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." *Ante,* at 592-593. The Court then states that a "key question" to be answered in deciding whether something is "scientific knowledge" "will be whether it can be (and has been) tested." *Ante,* at 593. Following this sentence are three quotations from treatises, which not only speak of empirical testing, but one of which states that the "`criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.' " *Ibid.*

I defer to no one in my confidence in federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its "falsifiability," and I suspect some of them will be, too.

I do not doubt that Rule 702 confides to the judge some gatekeeping responsibility in deciding questions of the admissibility of proffered expert testimony. But I do not think 601*601 it imposes on them either the obligation or the authority to become amateur scientists in order to perform that role. I think the Court would be far better advised in this case to decide only the questions presented, and to leave the further development of this important area of the law to future cases.

[*] Briefs of *amici curiae* urging reversal were filed for the State of Texas et al. by *Dan Morales,* Attorney General of Texas, *Mark Barnett,* Attorney General of South Dakota, *Marc Racicot,* Attorney General of Montana, *Larry EchoHawk,* Attorney General of Idaho, and *Brian Stuart Koukoutchos;* for the American Society of Law, Medicine and Ethics et al. by *Joan E. Bertin, Marsha S. Berzon,* and *Albert H. Meyerhoff;* for the Association of Trial Lawyers of America by *Jeffrey Robert White* and *Roxanne Barton Conlin;* for Ronald Bayer et al. by *Brian Stuart Koukoutchos, Priscilla Budeiri, Arthur Bryant,* and *George W. Conk;* and for Daryl E. Chubin et al. by *Ron Simon* and *Nicole Schultheis.*

Briefs of *amici curiae* urging affirmance were filed for the United States by *Acting Solicitor General Wallace, Assistant Attorney General Gerson, Miguel A. Estrada, Michael Jay Singer,* and *John P. Schnitker;* for the American Insurance Association by *William J. Kilberg, Paul Blankenstein, Bradford R. Clark,* and *Craig A. Berrington;* for the American Medical

Association et al. by *Carter G. Phillips, Mark D. Hopson,* and *Jack R. Bierig;* for the American Tort Reform Association by *John G. Kester* and *John W. Vardaman, Jr.;* for the Chamber of Commerce of the United States by *Timothy B. Dyk, Stephen A. Bokat,* and *Robin S. Conrad;* for the Pharmaceutical Manufacturers Association by *Louis R. Cohen* and *Daniel Marcus;* for the Product Liability Advisory Council, Inc., et al. by *Victor E. Schwartz, Robert P. Charrow,* and *Paul F. Rothstein;* for the Washington Legal Foundation by *Scott G. Campbell, Daniel J. Popeo,* and *Richard A. Samp;* and for Nicolaas Bloembergen et al. by *Martin S. Kaufman.*

Briefs of *amici curiae* were filed for the American Association for the Advancement of Science et al. by *Richard A. Meserve* and *Bert Black;* for the American College of Legal Medicine by *Miles J. Zaremski;* for the Carnegie Commission on Science, Technology, and Government by *Steven G. Gallagher, Elizabeth H. Esty,* and *Margaret A. Berger;* for the Defense Research Institute, Inc., by *Joseph A. Sherman, E. Wayne Taff,* and *Harvey L. Kaplan;* for the New England Journal of Medicine et al. by *Michael Malina* and *Jeffrey I. D. Lewis;* for A Group of American Law Professors by *Donald N. Bersoff;* for Alvan R. Feinstein by *Don M. Kennedy, Loretta M. Smith,* and *Richard A. Oetheimer;* and for Kenneth Rothman et al. by *Neil B. Cohen.*

[1] Doctor Lamm received his master's and doctor of medicine degrees from the University of Southern California. He has served as a consultant in birth-defect epidemiology for the National Center for Health Statistics and has published numerous articles on the magnitude of risk from exposure to various chemical and biological substances. App. 34-44.

[2] For example, Shanna Helen Swan, who received a master's degree in biostatistics from Columbia University and a doctorate in statistics from the University of California at Berkeley, is chief of the section of the California Department of Health and Services that determines causes of birth defects and has served as a consultant to the World Health Organization, the Food and Drug Administration, and the National Institutes of Health. *Id.,* at 113-114, 131-132. Stuart A. Newman, who received his bachelor's degree in chemistry from Columbia University and his master's and doctorate in chemistry from the University of Chicago, is a professor at New York Medical College and has spent over a decade studying the effect of chemicals on limb development. *Id.,* at 54-56. The credentials of the others are similarly impressive. See *id.,* at 61-66, 73-80, 148-153, 187— 192, and Attachments 12, 20, 21, 26, 31, and 32 to Petitioners' Opposition to Summary Judgment in No. 84-———G(I) (SD Cal.).

[3] For a catalog of the many cases on either side of this controversy, see P. Giannelli & E. Imwinkelried, Scientific Evidence § 1-5, pp. 10-14 (1986 and Supp. 1991).

[4] See, *e. g.,* Green, Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of *Agent Orange* and Bendectin Litigation, 86 Nw. U. L. Rev. 643 (1992) (hereinafter Green); Becker & Orenstein, The Federal Rules of Evidence After Sixteen Years—The Effect of "Plain Meaning" Jurisprudence, the Need for an Advisory Committee on the Rules of Evidence, and Suggestions for Selective Revision of the Rules, 60 Geo. Wash. L. Rev. 857, 876-885 (1992); Hanson, James Alphonzo Frye is Sixty-Five Years Old; Should He Retire?, 16 West. St. U. L. Rev. 357 (1989); Black, A Unified Theory of Scientific Evidence, 56 Ford. L. Rev. 595 (1988); Imwinkelried, The "Bases" of Expert Testimony: The Syllogistic Structure of Scientific Testimony, 67 N. C. L. Rev. 1 (1988); Proposals for a Model Rule on the

Admissibility of Scientific Evidence, 26 Jurimetrics J. 235 (1986); Giannelli, The Admissibility of Novel Scientific Evidence: *Frye* v. *United States*, a Half-Century Later, 80 Colum. L. Rev. 1197 (1980); The Supreme Court, 1986 Term, 101 Harv. L. Rev. 7, 119, 125-127 (1987).

Indeed, the debates over *Frye* are such a well-established part of the academic landscape that a distinct term—"*Frye* -ologist"—has been advanced to describe those who take part. See Behringer, Introduction, Proposals for a Model Rule on the Admissibility of Scientific Evidence, 26 Jurimetrics J. 237, 239 (1986), quoting Lacey, Scientific Evidence, 24 Jurimetrics J. 254, 264 (1984).

[5] Like the question of *Frye* `s merit, the dispute over its survival has divided courts and commentators. Compare, *e. g.*, *United States* v. *Williams*, 583 F. 2d 1194 (CA2 1978) (*Frye* is superseded by the Rules of Evidence), cert. denied, 439 U. S. 1117 (1979), with *Christophersen* v. *Allied-Signal Corp.*, 939 F. 2d 1106, 1111, 1115-1116 (CA5 1991) (en banc) (*Frye* and the Rules coexist), cert. denied, 503 U. S. 912 (1992), 3 J. Weinstein & M. Berger, Weinstein's Evidence ¶ 702[03], pp. 702-36 to 702-37 (1988) (hereinafter Weinstein & Berger) (*Frye* is dead), and M. Graham, Handbook of Federal Evidence § 703.2 (3d ed. 1991) (*Frye* lives). See generally P. Giannelli & E. Imwinkelried, Scientific Evidence § 1-5, at 28-29 (citing authorities).

[6] Because we hold that *Frye* has been superseded and base the discussion that follows on the content of the congressionally enacted Federal Rules of Evidence, we do not address petitioners' argument that application of the *Frye* rule in this diversity case, as the application of a judgemade rule affecting substantive rights, would violate the doctrine of *Erie R. Co.* v. *Tompkins*, 304 U. S. 64 (1938).

[7] The Chief Justice "do[es] not doubt that Rule 702 confides to the judge some gatekeeping responsibility," *post*, at 600, but would neither say how it does so nor explain what that role entails. We believe the better course is to note the nature and source of the duty.

[8] Rule 702 also applies to"technical, or other specialized knowledge." Our discussion is limited to the scientific context because that is the nature of the expertise offered here.

[9] We note that scientists typically distinguish between "validity" (does the principle support what it purports to show?) and "reliability"(does application of the principle produce consistent results?). See Black, 56 Ford. L. Rev., at 599. Although "the difference between accuracy, validity, and reliability may be such that each is distinct from the other by no more than a hen's kick," Starrs, *Frye v. United States* Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702, 26 Jurimetrics J.249, 256 (1986), our reference here is to*evidentiary* reliability— that is, trustworthiness. Cf., *e. g.*, Advisory Committee's Notes on Fed. Rule Evid. 602, 28 U. S. C. App., p. 755 ("`[T]he rule requiring that a witness who testifies to a fact which can be perceived by the senses must have had an opportunity to observe, and must have actually observed the fact' is a `most pervasive manifestation' of the common law insistence upon `the most reliable sources of information' " (citation omitted)); Advisory Committee's Notes on Art. VIII of Rules of Evidence, 28 U. S. C.App., p. 770 (hearsay exceptions will be recognized only "under circumstances supposed to furnish guarantees of trustworthiness"). In a case involving scientific evidence, *evidentiary reliability* will be based upon *scientific validity*.

[10] Rule 104(a) provides:

"Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b) [pertaining to conditional admissions]. In making its determination it is not bound by the rules of evidence except those with respect to privileges." These matters should be established by a preponderance of proof. See *Bourjaily* v. *United States*, 483 U. S. 171, 175-176 (1987).

[11] Although the *Frye* decision itself focused exclusively on "novel" scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, wellestablished propositions are less likely to be challenged than those that are novel, and they are more handily defended. Indeed, theories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Federal Rule of Evidence 201.

[12] A number of authorities have presented variations on the reliability approach, each with its own slightly different set of factors. See, *e. g.*, *Downing*, 753 F. 2d, at 1238-1239 (on which our discussion draws in part); 3 Weinstein & Berger ¶ 702[03], pp. 702-41 to 702-42 (on which the *Downing* court in turn partially relied); McCormick, Scientific Evidence: Defining a New Approach to Admissibility, 67 Iowa L. Rev. 879, 911-912 (1982); and Symposium on Science and the Rules of Evidence, 99 F. R. D. 187, 231 (1983) (statement by Margaret Berger). To the extent that they focus on the reliability of evidence as ensured by the scientific validity of its underlying principles, all these versions may well have merit, although we express no opinion regarding any of their particular details.

[13] This is not to say that judicial interpretation, as opposed to adjudicative factfinding, does not share basic characteristics of the scientific endeavor: "The work of a judge is in one sense enduring and in another ephemeral. . . . In the endless process of testing and retesting, there is a constant rejection of the dross and a constant retention of whatever is pure and sound and fine." B. Cardozo, The Nature of the Judicial Process 178-179 (1921).

KUMHO TIRE COMPANY, LTD., *et al.* , PETITIONERS
v.* PATRICK CARMICHAEL, *etc* ., *et al.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE ELEVENTH CIRCUIT

[March 23, 1999]

Justice Breyer delivered the opinion of the Court.

In *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 509 U. S. 579 (1993), this Court focused upon the admissibility of scientific expert testimony. It pointed out that such testimony is admissible only if it is both relevant and reliable. And it held that the Federal Rules of Evidence "assign to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand." *Id.*, at 597. The Court also discussed certain more specific factors, such as testing, peer review, error rates, and "acceptability" in the relevant scientific community, some or all of which might prove helpful in determining the reliability of a particular scientific "theory or technique." *Id.*, at 593-594.

This case requires us to decide how *Daubert* applies to the testimony of engineers and other experts who are not scientists. We conclude that *Daubert* 's general holding-- setting forth the trial judge's general "gatekeeping" obligation--applies not only to testimony based on "scientific" knowledge, but also to testimony based on "technical" and "other specialized" knowledge. See Fed. Rule Evid. 702. We also conclude that a trial court *may* consider one or more of the more specific factors that *Daubert* mentioned when doing so will help determine that testimony's reliability. But, as the Court stated in *Daubert* , the test of reliability is "flexible," and *Daubert* 's list of specific factors neither necessarily nor exclusively applies to all experts or in every case. Rather, the law grants a district court the same broad latitude when it decides *how* to determine reliability as it enjoys in respect to its ultimate reliability determination. See *General Electric Co.* v. *Joiner*, 522 U. S. 136, 143 (1997) (courts of appeals are to apply "abuse of discretion" standard when reviewing district court's reliability determination). Applying these standards, we determine that the District Court's decision in this case--not to admit certain expert testimony--was within its discretion and therefore lawful.

I

On July 6, 1993, the right rear tire of a minivan driven by Patrick Carmichael blew out. In the accident that followed, one of the passengers died, and others were severely injured. In October 1993, the Carmichaels brought this diversity suit against the tire's maker and its distributor, whom we refer to collectively as Kumho Tire, claiming that the tire was defective. The plaintiffs rested their case in significant part upon deposition testimony provided by an expert in tire failure analysis, Dennis Carlson, Jr., who intended to testify in support of their conclusion.

Carlson's depositions relied upon certain features of tire technology that are not in dispute. A steel-belted radial tire like the Carmichaels' is made up of a "carcass" containing many layers of flexible cords, called "plies," along which (between the cords and the outer tread) are laid steel strips called "belts." Steel wire loops, called "beads," hold the cords together at the plies' bottom edges. An outer layer, called the "tread," encases the carcass, and the entire tire is bound together in rubber, through the application of heat and various chemicals. See generally, *e.g.* , J. Dixon, Tires, Suspension and Handling 68-72 (2d ed. 1996). The bead of the tire sits upon a "bead seat," which is part of the wheel assembly. That assembly contains a "rim flange," which extends over the bead and rests against the side of the tire. See M. Mavrigian, Performance Wheels & Tires 81, 83 (1998) (illustrations).

[Graphic omitted; see printed opinion.]A. Markovich, How To Buy and Care For Tires 4 (1994).

Carlson's testimony also accepted certain background facts about the tire in question. He assumed that before the blowout the tire had traveled far. (The tire was made in 1988 and had been installed some time before the Carmichaels bought the used minivan in March 1993; the Carmichaels had driven the van approximately 7,000 additional miles in the two months they had owned it.) Carlson noted that the tire's tread depth, which was 11/32 of an inch when new, App. 242, had been worn down to depths that ranged from 3/32 of an inch along some parts of the tire, to nothing at all along others. *Id.,* at 287. He conceded that the tire tread had at least two punctures which had been inadequately repaired. *Id.,* at 258-261, 322.

Despite the tire's age and history, Carlson concluded that a defect in its manufacture or design caused the blow-out. He rested this conclusion in part upon three premises which, for present purposes, we must assume are not in dispute: First, a tire's carcass should stay bound to the inner side of the tread for a significant period of time after its tread depth has worn away. *Id.,* at 208-209. Second, the tread of the tire at issue had separated from its inner steel-belted carcass prior to the accident. *Id.,* at 336. Third, this "separation" caused the blowout. *Ibid.*

Carlson's conclusion that a defect caused the separation, however, rested upon certain other propositions, several of which the defendants strongly dispute. First, Carlson said that if a separation is *not* caused by a certain kind of tire misuse called "overdeflection" (which consists of underinflating the tire or causing it to carry too much weight, thereby generating heat that can undo the chemical tread/carcass bond), then, ordinarily, its cause is a tire defect. *Id.,* at 193-195, 277-278. Second, he said that if a tire has been subject to sufficient overdeflection to cause a separation, it should reveal certain physical symptoms. These symptoms include (a) tread wear on the tire's shoulder that is greater than the tread wear along the tire's center, *id.,* at 211; (b) signs of a "bead groove," where the beads have been pushed too hard against the bead seat on the inside of the tire's rim, *id.,* at 196-197; (c) sidewalls of the tire with physical signs of deterioration, such as discoloration, *id.,* at 212; and/or (d) marks on the tire's rim flange, *id.,* at 219-220. Third, Carlson said that where he does not find *at least two* of the four physical signs just mentioned (and presumably where there is no reason to suspect a less common cause of separation), he concludes that a manufacturing or design defect caused the separation. *Id.,* at 223-224.

Carlson added that he had inspected the tire in question. He conceded that the tire to a limited degree showed greater wear on the shoulder than in the center, some signs of "bead groove," some discoloration, a few marks on the rim flange, and inadequately filled puncture holes (which can also cause heat that might lead to separation). *Id.*, at 256-257, 258-261, 277, 303-304, 308. But, in each instance, he testified that the symptoms were not significant, and he explained why he believed that they did not reveal overdeflection. For example, the extra shoulder wear, he said, appeared primarily on one shoulder, whereas an overdeflected tire would reveal equally abnormal wear on both shoulders. *Id.*, at 277. Carlson concluded that the tire did not bear at least two of the four overdeflection symptoms, nor was there any less obvious cause of separation; and since neither overdeflection nor the punctures caused the blowout, a defect must have done so.

Kumho Tire moved the District Court to exclude Carlson's testimony on the ground that his methodology failed Rule 702's reliability requirement. The court agreed with Kumho that it should act as a *Daubert* -type reliability "gatekeeper," even though one might consider Carlson's testimony as "technical," rather than "scientific." See *Carmichael* v. *Samyang Tires, Inc.* , 923 F. Supp. 1514, 1521-1522 (SD Ala. 1996). The court then examined Carlson's methodology in light of the reliability-related factors that *Daubert* mentioned, such as a theory's testability, whether it "has been a subject of peer review or publication," the "known or potential rate of error," and the "degree of acceptance ... within the relevant scientific community." 923 F. Supp., at 1520 (citing *Daubert* , 509 U. S., at 592 -594). The District Court found that all those factors argued against the reliability of Carlson's methods, and it granted the motion to exclude the testimony (as well as the defendants' accompanying motion for summary judgment).

The plaintiffs, arguing that the court's application of the *Daubert* factors was too "inflexible," asked for reconsideration. And the Court granted that motion. *Carmichael* v. *Samyang Tires, Inc.*, Civ. Action No. 93-0860-CB-S (SD Ala., June 5, 1996), App. to Pet. for Cert. 1c. After reconsidering the matter, the court agreed with the plaintiffs that *Daubert* should be applied flexibly, that its four factors were simply illustrative, and that other factors could argue in favor of admissibility. It conceded that there may be widespread acceptance of a "visual-inspection method" for some relevant purposes. But the court found insufficient indications of the reliability of

> "the component of Carlson's tire failure analysis which most concerned the Court, namely, the methodology employed by the expert in analyzing the data obtained in the visual inspection, and the scientific basis, if any, for such an analysis." *Id.*, at 6c.

It consequently affirmed its earlier order declaring Carlson's testimony inadmissable and granting the defendants' motion for summary judgment.

The Eleventh Circuit reversed. See *Carmichael* v. *Samyang Tire, Inc.* , 131 F. 3d 1433 (1997). It "review[ed] ... *de novo* " the "district court's legal decision to apply *Daubert* ." *Id.*, at 1435. It noted that "the Supreme Court in *Daubert* explicitly limited its holding to cover only the `scientific context,' " adding that "a *Daubert* analysis" applies only where an expert relies "on the application of scientific principles," rather than "on skill- or experience-based observation." *Id.*, at 1435-1436. It concluded that Carlson's testimony, which it viewed as relying on experience, "falls outside the scope of *Daubert* ," that "the district court erred as a matter of law by applying

Daubert in this case," and that the case must be remanded for further (non- *Daubert* -type) consideration under Rule 702. *Id.,* at 1436.

Kumho Tire petitioned for certiorari, asking us to determine whether a trial court "may" consider *Daubert* 's specific "factors" when determining the "admissibility of an engineering expert's testimony." Pet. for Cert. i. We granted certiorari in light of uncertainty among the lower courts about whether, or how, *Daubert* applies to expert testimony that might be characterized as based not upon "scientific" knowledge, but rather upon "technical" or "other specialized" knowledge. Fed. Rule Evid. 702; compare, *e.g., Watkins* v. *Telsmith, Inc.* , 121 F. 3d 984, 990-991 (CA5 1997), with, *e.g., Compton* v. *Subaru of America, Inc.* , 82 F. 3d 1513, 1518-1519 (CA10), cert. denied, 519 U. S. 1042 (1996).

II

A

In *Daubert* , this Court held that Federal Rule of Evidence 702 imposes a special obligation upon a trial judge to "ensure that any and all scientific testimony ... is not only relevant, but reliable." 509 U. S., at 589 . The initial question before us is whether this basic gatekeeping obligation applies only to "scientific" testimony or to all expert testimony. We, like the parties, believe that it applies to all expert testimony. See Brief for Petitioners 19; Brief for Respondents 17.

For one thing, Rule 702 itself says:

> "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."

This language makes no relevant distinction between "scientific" knowledge and "technical" or "other specialized" knowledge. It makes clear that any such knowledge might become the subject of expert testimony. In *Daubert* , the Court specified that it is the Rule's word "knowledge," not the words (like "scientific") that modify that word, that "establishes a standard of evidentiary reliability." 509 U. S., at 589 -590. Hence, as a matter of language, the Rule applies its reliability standard to all "scientific," "technical," or "other specialized" matters within its scope. We concede that the Court in *Daubert* referred only to "scientific" knowledge. But as the Court there said, it referred to "scientific" testimony "because that [wa]s the nature of the expertise" at issue. *Id.,* at 590, n. 8.

Neither is the evidentiary rationale that underlay the Court's basic *Daubert* "gatekeeping" determination limited to "scientific" knowledge. *Daubert* pointed out that Federal Rules 702 and 703 grant expert witnesses testimonial latitude unavailable to other witnesses on the "assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." *Id.,* at 592 (pointing out that experts may testify to opinions, including those that are

not based on firsthand knowledge or observation). The Rules grant that latitude to all experts, not just to "scientific" ones.

Finally, it would prove difficult, if not impossible, for judges to administer evidentiary rules under which a gatekeeping obligation depended upon a distinction between "scientific" knowledge and "technical" or "other specialized" knowledge. There 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. And conceptual efforts to distinguish the two are unlikely to produce clear legal lines capable of application in particular cases. Cf. Brief for National Academy of Engineering as *Amicus Curiae* 9 (scientist seeks to understand nature while the engineer seeks nature's modification); Brief for Rubber Manufacturers Association as *Amicus Curiae* 14-16 (engineering, as an "applied science," relies on "scientific reasoning and methodology"); Brief for John Allen et al. as *Amici Curiae* 6 (engineering relies upon "scientific knowledge and methods").

Neither is there a convincing need to make such distinctions. Experts of all kinds tie observations to conclusions through the use of what Judge Learned Hand called "general truths derived from ... specialized experience." Hand, Historical and Practical Considerations Regarding Expert Testimony, 15 Harv. L. Rev. 40, 54 (1901). And whether the specific expert testimony focuses upon specialized observations, the specialized translation of those observations into theory, a specialized theory itself, or the application of such a theory in a particular case, the expert's testimony often will rest "upon an experience confessedly foreign in kind to [the jury's] own." *Ibid.* The trial judge's effort to assure that the specialized testimony is reliable and relevant can help the jury evaluate that foreign experience, whether the testimony reflects scientific, technical, or other specialized knowledge.

We conclude that *Daubert* 's general principles apply to the expert matters described in Rule 702. The Rule, in respect to all such matters, "establishes a standard of evidentiary reliability." 509 U. S., at 590 . It "requires a valid ... connection to the pertinent inquiry as a precondition to admissibility." *Id.,* at 592. And where such testimony's factual basis, data, principles, methods, or their application are called sufficiently into question, see Part III, *infra* , the trial judge must determine whether the testimony has "a reliable basis in the knowledge and experience of [the relevant] discipline." 509 U. S., at 592 .

B

The petitioners ask more specifically whether a trial judge determining the "admissibility of an engineering expert's testimony" *may* consider several more specific factors that *Daubert* said might "bear on" a judge's gate-keeping determination. These factors include:

--Whether a "theory or technique ... can be (and has been) tested";

--Whether it "has been subjected to peer review and publication";

--Whether, in respect to a particular technique, there is a high "known or potential rate of error" and whether there are "standards controlling the technique's operation"; and

--Whether the theory or technique enjoys "general acceptance" within a "relevant scientific community." 509 U. S., at 592 -594.

Emphasizing the word "may" in the question, we answer that question yes.

Engineering testimony rests upon scientific foundations, the reliability of which will be at issue in some cases. See, *e.g.* , Brief for Stephen Bobo et al. as *Amici Curiae* 23 (stressing the scientific bases of engineering disciplines). In other cases, the relevant reliability concerns may focus upon personal knowledge or experience. As the Solicitor General points out, there are many different kinds of experts, and many different kinds of expertise. See Brief for United States as *Amicus Curiae* 18-19, and n. 5 (citing cases involving experts in drug terms, handwriting analysis, criminal *modus operandi* , land valuation, agricultural practices, railroad procedures, attorney's fee valuation, and others). Our emphasis on the word "may" thus reflects *Daubert* 's description of the Rule 702 inquiry as "a flexible one." 509 U. S., at 594 . *Daubert* makes clear that the factors it mentions do *not* constitute a "definitive checklist or test." *Id.,* at 593. And *Daubert* adds that the gatekeeping inquiry must be " `tied to the facts' " of a particular "case." *Id.,* at 591 (quoting *United States* v. *Downing* , 753 F. 2d 1224, 1242 (CA3 1985)). We agree with the Solicitor General that "[t]he factors identified in *Daubert* may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony." Brief for United States as *Amicus Curiae* 19. The conclusion, in our view, is that we can neither rule out, nor rule in, for all cases and for all time the applicability of the factors mentioned in *Daubert* , nor can we now do so for subsets of cases categorized by category of expert or by kind of evidence. Too much depends upon the particular circumstances of the particular case at issue.

Daubert itself is not to the contrary. It made clear that its list of factors was meant to be helpful, not definitive. Indeed, those factors do not all necessarily apply even in every instance in which the reliability of scientific testimony is challenged. It might not be surprising in a particular case, for example, that a claim made by a scientific witness has never been the subject of peer review, for the particular application at issue may never previously have interested any scientist. Nor, on the other hand, does the presence of *Daubert* 's general acceptance factor help show that an expert's testimony is reliable where the discipline itself lacks reliability, as, for example, do theories grounded in any so-called generally accepted principles of astrology or necromancy.

At the same time, and contrary to the Court of Appeals' view, some of *Daubert* 's questions can help to evaluate the reliability even of experience-based testimony. In certain cases, it will be appropriate for the trial judge to ask, for example, how often an engineering expert's experience-based methodology has produced erroneous results, or whether such a method is generally accepted in the relevant engineering community. Likewise, it will at times be useful to ask even of a witness whose expertise is based purely on experience, say, a perfume tester able to

distinguish among 140 odors at a sniff, whether his preparation is of a kind that others in the field would recognize as acceptable.

We must therefore disagree with the Eleventh Circuit's holding that a trial judge may ask questions of the sort *Daubert* mentioned only where an expert "relies on the application of scientific principles," but not where an expert relies "on skill- or experience-based observation." 131 F. 3d, at 1435. We do not believe that Rule 702 creates a schematism that segregates expertise by type while mapping certain kinds of questions to certain kinds of experts. Life and the legal cases that it generates are too complex to warrant so definitive a match.

To say this is not to deny the importance of *Daubert* 's gatekeeping requirement. The objective of that requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field. Nor do we deny that, as stated in *Daubert* , the particular questions that it mentioned will often be appropriate for use in determining the reliability of challenged expert testimony. Rather, we conclude that the trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable. That is to say, a trial court should consider the specific factors identified in *Daubert* where they are reasonable measures of the reliability of expert testimony.

C

The trial court must have the same kind of latitude in deciding *how* to test an expert's reliability, and to decide whether or when special briefing or other proceedings are needed to investigate reliability, as it enjoys when it decides *whether* that expert's relevant testimony is reliable. Our opinion in *Joiner* makes clear that a court of appeals is to apply an abuse-of-discretion standard when it "review[s] a trial court's decision to admit or exclude expert testimony." 522 U. S., at 138 -139. That standard applies as much to the trial court's decisions about how to determine reliability as to its ultimate conclusion. Otherwise, the trial judge would lack the discretionary authority needed both to avoid unnecessary "reliability" proceedings in ordinary cases where the reliability of an expert's methods is properly taken for granted, and to require appropriate proceedings in the less usual or more complex cases where cause for questioning the expert's reliability arises. Indeed, the Rules seek to avoid "unjustifiable expense and delay" as part of their search for "truth" and the "jus[t] determin[ation]" of proceedings. Fed. Rule Evid. 102. Thus, whether *Daubert* 's specific factors are, or are not, reasonable measures of reliability in a particular case is a matter that the law grants the trial judge broad latitude to determine. See *Joiner , supra,* at 143. And the Eleventh Circuit erred insofar as it held to the contrary.

III

We further explain the way in which a trial judge "may" consider *Daubert* 's factors by applying these considerations to the case at hand, a matter that has been briefed exhaustively by the parties and their 19 *amici* . The District Court did not doubt Carlson's qualifications, which

included a masters degree in mechanical engineering, 10 years' work at Michelin America, Inc., and testimony as a tire failure consultant in other tort cases. Rather, it excluded the testimony because, despite those qualifications, it initially doubted, and then found unreliable, "the methodology employed by the expert in analyzing the data obtained in the visual inspection, and the scientific basis, if any, for such an analysis." Civ. Action No. 93-0860-CB-S (SD Ala., June 5, 1996), App. to Pet. for Cert. 6c. After examining the transcript in "some detail," 923 F. Supp., at 1518-519, n. 4, and after considering respondents' defense of Carlson's methodology, the District Court determined that Carlson's testimony was not reliable. It fell outside the range where experts might reasonably differ, and where the jury must decide among the conflicting views of different experts, even though the evidence is "shaky." *Daubert* , 509 U. S., at 596 . In our view, the doubts that triggered the District Court's initial inquiry here were reasonable, as was the court's ultimate conclusion.

For one thing, and contrary to respondents' suggestion, the specific issue before the court was not the reasonableness *in general* of a tire expert's use of a visual and tactile inspection to determine whether overdeflection had caused the tire's tread to separate from its steel-belted carcass. Rather, it was the reasonableness of using such an approach, along with Carlson's particular method of analyzing the data thereby obtained, to draw a conclusion regarding *the particular matter to which the expert testimony was directly relevant*. That matter concerned the likelihood that a defect in the tire at issue caused its tread to separate from its carcass. The tire in question, the expert conceded, had traveled far enough so that some of the tread had been worn bald; it should have been taken out of service; it had been repaired (inadequately) for punctures; and it bore some of the very marks that the expert said indicated, not a defect, but abuse through overdeflection. See *supra* , at 3-5; App. 293-294. The relevant issue was whether the expert could reliably determine the cause of *this* tire's separation.

Nor was the basis for Carlson's conclusion simply the general theory that, in the absence of evidence of abuse, a defect will normally have caused a tire's separation. Rather, the expert employed a more specific theory to establish the existence (or absence) of such abuse. Carlson testified precisely that in the absence of *at least two* of four signs of abuse (proportionately greater tread wear on the shoulder; signs of grooves caused by the beads; discolored sidewalls; marks on the rim flange) he concludes that a defect caused the separation. And his analysis depended upon acceptance of a further implicit proposition, namely, that his visual and tactile inspection could determine that the tire before him had not been abused despite some evidence of the presence of the very signs for which he looked (and two punctures).

For another thing, the transcripts of Carlson's depositions support both the trial court's initial uncertainty and its final conclusion. Those transcripts cast considerable doubt upon the reliability of both the explicit theory (about the need for two signs of abuse) and the implicit proposition (about the significance of visual inspection in this case). Among other things, the expert could not say whether the tire had traveled more than 10, or 20, or 30, or 40, or 50 thousand miles, adding that 6,000 miles was "about how far" he could "say with any certainty." *Id.*, at 265. The court could reasonably have wondered about the reliability of a method of visual and tactile inspection sufficiently precise to ascertain with some certainty the abuse-related significance of minute shoulder/center relative tread wear differences, but insufficiently precise to tell "with any certainty" from the tread wear whether a tire had traveled less than 10,000 or more than 50,000

miles. And these concerns might have been augmented by Carlson's repeated reliance on the "subjective[ness]" of his mode of analysis in response to questions seeking specific information regarding how he could differentiate between a tire that actually had been overdeflected and a tire that merely looked as though it had been. *Id.*, at 222, 224-225, 285-286. They would have been further augmented by the fact that Carlson said he had inspected the tire itself for the first time the morning of his first deposition, and then only for a few hours. (His initial conclusions were based on photographs.) *Id.*, at 180.

Moreover, prior to his first deposition, Carlson had issued a signed report in which he concluded that the tire had "not been ... overloaded or underinflated," not because of the absence of "two of four" signs of abuse, but simply because "the rim flange impressions . . . were normal." *Id.*, at 335-336. That report also said that the "tread depth remaining was 3/32 inch," *id.*, at 336, though the opposing expert's (apparently undisputed) measurements indicate that the tread depth taken at various positions around the tire actually ranged from .5/32 of an inch to 4/32 of an inch, with the tire apparently showing greater wear along *both* shoulders than along the center, *id.*, at 432-433.

Further, in respect to one sign of abuse, bead grooving, the expert seemed to deny the sufficiency of his own simple visual-inspection methodology. He testified that most tires have some bead groove pattern, that where there is reason to suspect an abnormal bead groove he would ideally "look at a lot of [similar] tires" to know the grooving's significance, and that he had not looked at many tires similar to the one at issue. *Id.*, at 212-213, 214, 217.

Finally, the court, after looking for a defense of Carlson's methodology as applied in these circumstances, found no convincing defense. Rather, it found (1) that "none" of the *Daubert* factors, including that of "general acceptance" in the relevant expert community, indicated that Carlson's testimony was reliable, 923 F. Supp., at 1521; (2) that its own analysis "revealed no countervailing factors operating in favor of admissibility which could outweigh those identified in *Daubert* ," App. to Pet. for Cert. 4c; and (3) that the "parties identified no such factors in their briefs," *ibid.* For these three reasons *taken together,* it concluded that Carlson's testimony was unreliable.

Respondents now argue to us, as they did to the District Court, that a method of tire failure analysis that employs a visual/tactile inspection is a reliable method, and they point both to its use by other experts and to Carlson's long experience working for Michelin as sufficient indication that that is so. But no one denies that an expert might draw a conclusion from a set of observations based on extensive and specialized experience. Nor does anyone deny that, as a general matter, tire abuse may often be identified by qualified experts through visual or tactile inspection of the tire. See Affidavit of H. R. Baumgardner 1-2, cited in Brief for National Academy of Forensic Engineers as *Amici Curiae* 16 (Tire engineers rely on visual examination and process of elimination to analyze experimental test tires). As we said before, *supra*, at 14, the question before the trial court was specific, not general. The trial court had to decide whether this particular expert had sufficient specialized knowledge to assist the jurors "in deciding the particular issues in the case." 4 J. McLaughlin, Weinstein's Federal Evidence ¶ ;702.05[1], p. 702-33 (2d ed. 1998); see also Advisory Committee's Note on Proposed Fed. Rule Evid. 702, Preliminary Draft of Proposed Amendments to the Federal Rules of Civil Procedure and

Evidence: Request for Comment 126 (1998) (stressing that district courts must "scrutinize" whether the "principles and methods" employed by an expert "have been properly applied to the facts of the case").

The particular issue in this case concerned the use of Carlson's two-factor test and his related use of visual/tactile inspection to draw conclusions on the basis of what seemed small observational differences. We have found no indication in the record that other experts in the industry use Carlson's two-factor test or that tire experts such as Carlson normally make the very fine distinctions about, say, the symmetry of comparatively greater shoulder tread wear that were necessary, on Carlson's own theory, to support his conclusions. Nor, despite the prevalence of tire testing, does anyone refer to any articles or papers that validate Carlson's approach. Compare Bobo, Tire Flaws and Separations, in Mechanics of Pneumatic Tires 636-637 (S. Clark ed. 1981); C. Schnuth et al., Compression Grooving and Rim Flange Abrasion as Indicators of Over-Deflected Operating Conditions in Tires, presented to Rubber Division of the American Chemical Society, Oct. 21-24, 1997; J. Walter & R. Kiminecz, Bead Contact Pressure Measurements at the Tire-Rim Interface, presented to Society of Automotive Engineers, Feb. 24-28, 1975. Indeed, no one has argued that Carlson himself, were he still working for Michelin, would have concluded in a report to his employer that a similar tire was similarly defective on grounds identical to those upon which he rested his conclusion here. Of course, Carlson himself claimed that his method was accurate, but, as we pointed out in *Joiner* , "nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert." 522 U. S., at 146 .

Respondents additionally argue that the District Court too rigidly applied *Daubert* 's criteria. They read its opinion to hold that a failure to satisfy any one of those criteria automatically renders expert testimony inadmissible. The District Court's initial opinion might have been vulnerable to a form of this argument. There, the court, after rejecting respondents' claim that Carlson's testimony was "exempted from *Daubert* -style scrutiny" because it was "technical analysis" rather than "scientific evidence," simply added that "none of the four admissibility criteria outlined by the *Daubert* court are satisfied." 923 F. Supp., at 1522. Subsequently, however, the court granted respondents' motion for reconsideration. It then explicitly recognized that the relevant reliability inquiry "should be `flexible,' " that its " `overarching subject [should be] ... validity' and reliability," and that " *Daubert* was intended neither to be exhaustive nor to apply in every case." App. to Pet. for Cert. 4c (quoting *Daubert* , 509 U. S., at 594 -595). And the court ultimately based its decision upon Carlson's failure to satisfy either *Daubert* 's factors *or any other* set of reasonable reliability criteria. In light of the record as developed by the parties, that conclusion was within the District Court's lawful discretion.

In sum, Rule 702 grants the district judge the discretionary authority, reviewable for its abuse, to determine reliability in light of the particular facts and circumstances of the particular case. The District Court did not abuse its discretionary authority in this case. Hence, the judgment of the Court of Appeals is

Reversed .

KUMHO TIRE COMPANY, LTD., *et al.* , PETITIONERS
v.* PATRICK CARMICHAEL, *etc* ., *et al.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE ELEVENTH CIRCUIT

[March 23, 1999]

Justice Scalia , with whom *Justice O'Connor* and *Justice Thomas* join, concurring.

I join the opinion of the Court, which makes clear that the discretion it endorses--trial-court discretion in choosing the manner of testing expert reliability--is not discretion to abandon the gatekeeping function. I think it worth adding that it is not discretion to perform the function inadequately. Rather, it is discretion to choose among *reasonable* means of excluding expertise that is *fausse* and science that is junky. Though, as the Court makes clear today, the *Daubert* factors are not holy writ, in a particular case the failure to apply one or another of them may be unreasonable, and hence an abuse of discretion.

KUMHO TIRE COMPANY, LTD., *et al.* , PETITIONERS
v.* PATRICK CARMICHAEL, *etc* ., *et al.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE ELEVENTH CIRCUIT

[March 23, 1999]

Justice Stevens , concurring in part and dissenting in part.

The only question that we granted certiorari to decide is whether a trial judge "[m]ay . . . consider the four factors set out by this Court in *Daubert* v. *Merrill Dow Pharmaceuticals, Inc.*, 509 U. S. 579 (1993), in a Rule 702 analysis of admissibility of an engineering expert's testimony." Pet. for Cert. i. That question is fully and correctly answered in Parts I and II of the Court's opinion, which I join.

Part III answers the quite different question whether the trial judge abused his discretion when he excluded the testimony of Dennis Carlson. Because a proper answer to that question requires a study of the record that can be performed more efficiently by the Court of Appeals than by the nine Members of this Court, I would remand the case to the Eleventh Circuit to perform that task. There are, of course, exceptions to most rules, but I firmly believe that it is neither fair to

litigants nor good practice for this Court to reach out to decide questions not raised by the certiorari petition. See *General Electric Co.* v. *Joiner,* 522 U. S. 136, 150-151 (1997) (*Stevens, J.* , concurring in part and dissenting in part).

Accordingly, while I do not feel qualified to disagree with the well-reasoned factual analysis in Part III of the Court's opinion, I do not join that Part, and I respectfully dissent from the Court's disposition of the case.

The following excerpts from *State v. Goode* are relevant to N.C.R. Evid. 702.

STATE OF NORTH CAROLINA v. GEORGE EARL GOODE, JR.

No. 10A94

SUPREME COURT OF NORTH CAROLINA

341 N.C. 513

(Filed 8 September 1995)

Michael F. Easley, Attorney General, by Tiare B. Smiley, Special Deputy Attorney General, for the State.

J. Clark Fischer for defendant-appellant.

ORR, Justice.

This case arises out of the stabbing deaths of Leon and Margaret Batten. At the time of the murders, Mr. Batten was the landlord of the trailer park in which defendant resided with his wife. On 30 March 1992, defendant was indicted for two counts of first-degree murder and one count of robbery with a dangerous weapon. Defendant was tried before a jury, and on 19 November 1993, the jury found defendant guilty of all charges. Following a capital sentencing proceeding, the jury recommended sentences of death for the murder convictions. In accordance with the jury's recommendation, the trial court entered one sentence of death for the first-degree murder conviction based on the theory of premeditation and deliberation and the felony murder theory, one sentence of death for the first-degree murder conviction based solely on the theory of premeditation and deliberation, and a sentence of forty years' imprisonment for the robbery with a dangerous weapon conviction.

After consideration of the assignments of error brought forward on appeal by the defendant and a thorough review of the transcript of the proceedings, the record on appeal, the briefs, and oral arguments, we conclude that defendant received a fair trial free from prejudicial error. For the reasons set forth below, we affirm his convictions and sentences.

At trial, the State's evidence tended to show the following: Glen Troublefield testified that on 29 February 1992, defendant arrived at his apartment between 4:00 and 5:00 p.m. accompanied by defendant's brother, Chris Goode, and Eugene DeCastro. After talking for a short while, the four men left for a club in a Nissan Maxima driven by defendant. Leonard Wiggins, a resident of Selma, North Carolina, testified that this same night at approximately 6:20 p.m., he observed defendant in the Maxima on Kay Drive. Wiggins testified that defendant stopped the car, got out, approached him, and asked, "Don't I know you?" Wiggins further testified that he replied, "No, I do not know you." Defendant then punched him in the eye and along with DeCastro robbed him of his jacket and necklace. Troublefield testified that at this

time, he heard Wiggins yell, "Help, I'm being robbed," and that defendant and DeCastro returned to the car carrying a jacket and necklace belonging to Wiggins.

Troublefield also testified that after defendant returned to the car, he began driving in an erratic manner and lost control of the car, which ended up in a ditch. After it was removed from the ditch, defendant drove to a store where the men purchased a bottle of wine. Troublefield testified that defendant resumed driving and shared the bottle of wine with Chris Goode and DeCastro. Thereafter, defendant again drove the car into a ditch. Troublefield testified that at this time, defendant, Chris Goode, and DeCastro were near a trailer. Troublefield exited the car and began running in the opposite direction.

James Adams testified that on 29 February 1992, he was a resident of the Dallas Mobile Home Park. Adams testified that between 7:15 and 7:30 p.m., he observed a black man in a trailer he knew to be unoccupied. He then notified the landlord, Mr. Batten, about his observation, and Mr. Batten followed him back to the trailer. As Mr. Batten approached the trailer, Adams observed someone go into the trailer and get something off the "eating table." Thereafter, Adams returned to his trailer and sat in his vehicle for approximately ten minutes before returning to the trailer where Mr. Batten was. As he approached the trailer, Adams observed four black men beating Mr. Batten, and he heard Mr. Batten crying out, "Help me. Help me. Please help me." Adams then left to go get help.

Levi Snead testified that when he arrived at the Dallas Mobile Home Park between 7:15 and 7:30 p.m. on 29 February 1992, he observed "three or four guys outside [a] trailer with the door wide open." They appeared to be "scuffling," and the person on the ground looked like he was trying to get up. Snead went to the Batten house to notify Mr. Batten of the trouble at his trailer park. Mr. Batten's wife, Margaret Batten, answered the door and informed him that she thought her husband was already at the trailer park. Snead then left to report the disturbance to a deputy sheriff. Snead testified that on his way to notify the sheriff, he passed Margaret Batten heading toward the trailer park.

Detective Michael Bass of the Johnston County Sheriff's Department testified that on 29 February 1992 at 7:33 p.m., he responded to a call concerning a disturbance at the Dallas Mobile Home Park. Detective Bass testified that when he arrived on the scene, he observed three black males, one of whom he identified as defendant, between a Toyota truck and a Buick parked in the yard of a trailer. As Detective Bass exited his patrol car, the three males fled the scene. At this time, Detective Bass found the bodies of Leon and Margaret Batten in the bed of the truck. Detective Bass observed Mr. Batten lying on his right side, with his head elevated slightly because of the fender wheel in the back of the truck. Mrs. Batten's shirt had been removed, her bra was up above her breast area, and she was bleeding heavily from her chest area. There was no pulse on either victim.

Lieutenant Ron Reynolds testified that on 29 February 1992 at 7:33 p.m., he was on patrol when he heard Detective Bass' dispatch regarding the trailer park and received a description of the three black men who had fled the crime scene. While on his way to assist in the call, he noticed a black man walking at a fast pace away from the trailer park, looking back over his shoulder. When the man refused to talk to Lieutenant Reynolds, he placed the man in his patrol car and transported him back to the trailer park. The man was later identified as defendant.

The other two suspects were also eventually apprehended. Reynolds further testified that police officers recovered a wallet containing Mr. Batten's identification cards and money during their search of defendant.

Patrick Byrd, an acquaintance and former jailmate of defendant, testified that on approximately 22 December 1992, defendant approached him while he was in his cell in the Johnston County jail. Byrd testified that defendant informed him that he was charged with murder. Byrd further testified that defendant told him that on the night of the murders, DeCastro and defendant's brother were in his trailer with him "drinking [and] smoking weed."

On direct examination by the prosecutor, Byrd further testified:

A. [Defendant] told me then the rent man came. He come [sic] to collect the rent cause they was [sic] a couple months behind. Then he speculated---told me he speculated that the rent man was messing around with his wife and they started fussing, you know.

Q. Who started fussing?

A. Mr. Goode, George.

Q. And who was he fussing with?

A. Mr. Batten.

Q. Go ahead.

A. Then he took him--DeCastro, took and hit him, he told me.

Q. Hit who?

A. Mr. Batten. Then he say [sic] he pull out the knife and started stabbing him.

Q. Who pulled out the knife?

A. George.

Q. Stabbed who?

A. Mr. Batten.

Q. Did he tell you anything else?

A. Yes, sir.

Q. Tell us about it.

A. Then he took him and put him in the back of the truck. While they were doing that his wife pulled up.

Q. Whose wife pulled up?

A. Mr. Batten's wife.

Q. Did he tell you what happened after that?

A. She got out and saw what happened, started hollering, you know, so they grabbed her.

Q. Did he tell you any more about that?

A. No. He told me they started messing with her.

Dr. Deborah Radisch, Associate Chief Medical Examiner of the State of North Carolina, was tendered and qualified as an expert in the field of forensic pathology. Dr. Radisch testified that she performed autopsies on the bodies of the victims on 1 March 1992. Dr. Radisch further testified that during the autopsy of Margaret Batten, she observed multiple injuries, including stab wounds in the chest, abdomen, head, and neck; six or seven broken ribs; and cuts through the esophagus, stomach, large intestine, spleen, right kidney, and liver. A total of twenty-three distinct stab wounds was found on Margaret Batten. Dr. Radisch also found several "defensive" wounds located on the backs of Mrs. Batten's hands. Dr. Radisch testified that in her opinion, the cause of death was multiple stab wounds to Mrs. Batten's chest and abdomen.

Dr. Radisch testified that during her autopsy of Leon Batten, she again observed multiple injuries, including four stab wounds to his chest and back, puncture wounds, bruising, areas of abrasion, bruising about his head and face, and several broken ribs. The cause of death was determined to be a stab wound to the left chest.

State Bureau of Investigation Special Agent Duane Deaver, who was proffered as an expert in the field of forensic serology and bloodstain pattern interpretation, testified that although he found no visible bloodstain located on defendant's boots, a chemical test indicated the presence of blood, the type of which could not be determined. Agent Deaver did not detect any visible bloodstains on defendant's coveralls, hat, or boxer shorts. It was Agent Deaver's opinion that the absence of blood on any of defendant's clothing had no exculpatory effect.

Ralph Richardson, a former Marine and friend of defendant's, testified that in March 1991, he gave defendant a Gerber brand knife with an interchangeable blade. He testified that the knife found at the crime scene and the knife he gave defendant were very similar and that he could not detect any differences. Testimony showed that the knife was capable of causing the stab wounds on the bodies of both victims.

Defendant also presented evidence during the trial. Defendant testified that on 29 February 1992, he and his brother were on their way to Johnston County when they saw DeCastro on the side of the road and picked him up. They arrived in Smithfield at approximately

5:30 p.m. and went to visit Glen Troublefield. Defendant testified that they had a few beers earlier in the afternoon and that he had a glass of gin at Troublefield's house.

The four men then left Troublefield's apartment. Defendant testified that as they approached a stop sign on Kay Drive, defendant thought he saw someone he knew, so he stopped and got out. Defendant testified that he approached the man, asked him a question, and when the man did not reply, defendant punched him and grabbed his coat. Defendant resumed driving, lost control of the car, and ran the car into a ditch. After having his car pulled out of the ditch by a friend, defendant drove to a nearby store, where he picked up the other three individuals who had walked there to wait for him. Defendant testified that they arrived at a club called "Red Avery's" shortly thereafter "but there wasn't [sic] too many people there" so they decided to go to defendant's trailer.

On the way to the trailer, defendant again drove his car into a ditch. Defendant testified that they could not remove the car from the ditch and that all four of them, including Troublefield, walked the rest of the way to defendant's trailer. Defendant testified that at the trailer, the four of them began drinking and that he consumed about a glass of wine. Thereafter, the men moved outside. After defendant spoke briefly with Deborah Atkinson, a friend of defendant's wife, Leon Batten pulled up in a car. Defendant testified that he informed Mr. Batten he was going to move out of the trailer and that he then went inside the trailer to get his tape player.

Defendant testified that while he was inside his trailer, he heard Mr. Batten "holler." Defendant went back outside, where he found his brother, DeCastro, and Troublefield beating Mr. Batten while he lay on the ground. Defendant testified that he became scared and confused and turned to walk away. Defendant further testified that he refused to help move the body of Mr. Batten and that at that time, he also discovered Troublefield was missing. Defendant then observed Mrs. Batten drive up to the trailer. Defendant testified that DeCastro began to stab Mrs. Batten with "some sort" of butcher knife when she exited the car and ran over to her husband. Defendant then saw Detective Bass arrive on the scene, and the three men fled. After he and his brother separated, an officer stopped defendant, patted him down, handcuffed him, and took him back to the trailer park.

After arguments of counsel and instructions by the trial court, the jury returned verdicts finding the defendant guilty of two counts of first-degree murder and one count of robbery with a dangerous weapon. Thereafter, the trial court conducted a separate capital sentencing proceeding for the murder conviction pursuant to N.C.G.S. § 15A-2000. . . .

I.

Defendant's first assignment of error concerns expert testimony by SBI Special Agent Duane Deaver on bloodstain pattern interpretation. Generally, "all relevant evidence is admissible," and "evidence which is not relevant is not admissible." N.C.G.S. § 8C-1, Rule 402 (1992). Evidence is considered relevant if it has "any tendency to make the existence of any fact

that is of consequence to the determination of the action more or less probable than it would be without the evidence." N.C.G.S. § 8C-1, Rule 401 (1992).

Specifically, the admissibility of expert testimony is also governed by Rule 702 of the North Carolina Rules of Evidence, which states:

> If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion.

N.C.G.S. § 8C-1, Rule 702 (1992). Preliminary questions concerning the qualifications of a witness to testify and the admissibility of evidence shall be determined by the trial court. N.C.G.S. § 8C-1, Rule 104(a) (1992).

Thus, under our Rules of Evidence, when a trial court is faced with a proffer of expert testimony, it must determine whether the expert is proposing to testify to scientific, technical, or other specialized knowledge that will assist the trier of fact to determine a fact in issue. As recognized by the United States Supreme Court in its most recent opinion addressing the admissibility of expert scientific testimony, this requires a preliminary assessment of whether the reasoning or methodology underlying the testimony is sufficiently valid and whether that reasoning or methodology can be properly applied to the facts in issue. *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, ___ U.S. ___, 125 L. Ed. 2d 469 (1993).

In *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984), this Court, addressing the reliability of footprint identification, gave a comprehensive review of the law concerning the determination of whether a proffered method is sufficiently reliable. Speaking for the Court, Justice Frye restated the following rule, which is applicable in assessing the reliability issue:

> "In general, when no specific precedent exists, scientifically accepted reliability justifies admission of the testimony of qualified witnesses, and such reliability may be found either by judicial notice or from the testimony of scientists who are expert in the subject matter, or by a combination of the two."

Id. at 148, 322 S.E.2d at 381 (quoting 1 Henry Brandis, Jr., *Brandis on North Carolina Evidence* § 86, at 323 (2d ed. 1982)). Further, in *Bullard*, this Court recognized the application of this rule in *State v. Rogers*, 233 N.C. 390, 64 S.E.2d 572 (1951), where we "took judicial notice of the fact that fingerprinting was sufficiently established." *Bullard*, 312 N.C. at 145, 322 S.E.2d at 379.

In *State v. Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990), Justice Whichard also examined the reliability of a scientific method of proof setting out the following principles:

> Reliability of a scientific procedure is usually established by expert testimony, and the acceptance of experts within the field is one index, though not the exclusive index, of reliability. *See State v. Bullard*, 312 N.C. at 147, 322 S.E.2d at

> 380; *State v. Peoples*, 311 N.C. 515, 532, 319 S.E.2d 177, 187 (1984). Thus, we do not adhere exclusively to the formula, enunciated in *Frye v. United States*, 54 App. D.C. 46, 293 F. 1013 (D.C. Cir. 1923), and followed in many jurisdictions, that the method of proof "must be sufficiently established to have gained general acceptance in the particular field in which it belongs." *Id.* at 1014. Believing that the inquiry underlying the *Frye* formula is one of the reliability of the scientific method rather than its popularity within a scientific community, we have focused on the following indices of reliability: the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked "to sacrifice its independence by accepting [the] scientific hypotheses on faith," and independent research conducted by the expert. *State v. Bullard*, 312 N.C. at 150-51, 322 S.E.2d at 382.

Pennington, 327 N.C. at 98, 393 S.E.2d at 852-53.

Pennington involved the reliability of the DNA profiling process. Expert testimony on this issue was given by a professor of genetics and microbiology, a forensic serologist, a staff scientist at Cellmark, and an assistant professor of microbiology. These experts testified as to their background and experience in the field of DNA profiling and the established techniques used in this field. In addition, the Court noted that these experts used visual aids in their testimony. This Court held that the expert testimony "established the reliability of the DNA profiling process" and "that the evidence of the DNA profile testing results was[, therefore,] properly admitted." *Id.* at 100, 393 S.E.2d at 854. For examples of cases in which this Court has held that the method of proof was not sufficiently reliable, *see State v. Peoples*, 311 N.C. 515, 319 S.E.2d 177 (holding hypnosis is an unreliable scientific process), and *State v. Foye*, 254 N.C. 704, 120 S.E.2d 169 (1961) (holding polygraph testing not acceptable as an instrument of evidence in criminal cases).

Once the trial court has determined that the method of proof is Sufficiently reliable as an area for expert testimony, the next level of inquiry is whether the witness testifying at trial is qualified as an expert to apply this method to the specific facts of the case. N.C.G.S. § 8C-1, Rule 702. "It is not necessary that an expert be experienced with the identical subject matter at issue or be a specialist, licensed, or even engaged in a specific profession." *State v. Evangelista*, 319 N.C. 152, 164, 353 S.E.2d 375, 384 (1987) (citing *Bullard*, 312 N.C. at 140, 322 S.E.2d at 376; *State v. Phifer*, 290 N.C. 203, 225 S.E.2d 786 (1976), *cert. denied*, 429 U.S. 1050, 50 L. Ed. 2d 766, *and cert. denied*, 429 U.S. 1123, 51 L. Ed. 2d 573, 97 S. Ct. 1160 (1977)). "It is enough that the expert witness 'because of his expertise is in a better position to have an opinion on the subject than is the trier of fact.'" *Id.* at 164, 353 S.E.2d at 384 (quoting *State v. Wilkerson*, 295 N.C. 559, 569, 247 S.E.2d 905, 911 (1978)). Further, "the trial judge is afforded wide latitude of discretion when making a determination about the admissibility of expert testimony." *Bullard*, 312 N.C. at 140, 322 S.E.2d at 376.

Finally, once qualified, the expert's testimony is still governed by the principles of relevancy. As previously stated, relevant evidence is defined as evidence having "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." N.C.G.S. § 8C-1, Rule 401.

Further, in judging relevancy, it should be noted that expert testimony is properly admissible when such testimony can assist the jury to draw certain inferences from facts because the expert is better qualified than the jury to draw such inferences. *Bullard*, 312 N.C. at 139, 322 S.E.2d at 376. Having set out the specific guidelines trial courts are to follow in determining the admissibility of expert testimony, we now must apply these guidelines to the issue presented.

In the present case, defendant's specific assignments of error regarding the expert testimony are (1) that the trial court erred in qualifying Agent Deaver as a purported bloodstain pattern interpretation expert, and (2) that the admission of this testimony constituted an alleged due process violation. However, defendant also contends in his brief that "blood spatter interpretation" is not an appropriate area for expert testimony, as it has not been established as scientifically reliable. Although defendant did not specifically object to this at trial, we will in our discretion address this issue because of the gravity of this case. We note, however, that the actual scientific method of proof involved in this case is "bloodstain pattern interpretation."

A.

First, we will address defendant's contention that bloodstain pattern interpretation is not an appropriate area for expert testimony. Defendant argues that because this area has not been established as a scientifically reliable field, it does not qualify as an area for expert testimony. We disagree.

A new scientific method of proof is admissible at trial if the method is sufficiently reliable." *Pennington*, 327 N.C. at 98, 393 S.E.2d at 852 (citing *Bullard*, 312 N.C. at 148, 322 S.E.2d at 381). As stated above, in determining reliability, a court may look to testimony by an expert specifically relating to the reliability, may take judicial notice, or may use a combination of the two. *Bullard*, 312 N.C. at 148, 322 S.E.2d at 381 (quoting 1 *Brandis on North Carolina Evidence* § 86, at 323). In the present case, Agent Deaver, a forensic serologist, testified extensively on *voir dire* concerning the reliability of bloodstain pattern interpretation.

Agent Deaver testified that bloodstain pattern interpretation is a "specialized crime scene technique" wherein a specially trained individual studies the blood and the types of stains at the scene of the crime, and then, based upon his knowledge of similar bloodstain characteristics and reproductions of the crime scene, he forms an opinion about "what actually occurred [at] the crime scene." In order to determine what occurred at the crime scene using this method of proof, experts rely upon specific categories of bloodstains which are defined by the way in which they are made. These categories can be established through observation and reconstruction, as similar stains are produced under similar circumstances. Further, Agent Deaver testified that the expert in the field of bloodstain pattern interpretation would reproduce the bloodstains in order to determine whether their observations and interpretations were correct. Our review of Agent Deaver's testimony leads us to conclude that it is sufficient to show that bloodstain pattern interpretation iis an appropriate area for expert testimony.

Further, this Court implicitly accepted bloodstain pattern interpretation as a scientific method of proof in *State v. Daughtry*, 340 N.C. 488, S.E.2d , 1995 WL 444437 (1995), as

did the Court of Appeals in *State v. Willis*, 109 N.C. App. 184, 426 S.E.2d 471, *disc. rev. denied*, 333 N.C. 795, 431 S.E.2d 29 (1993). We also note that appellate courts in other jurisdictions have reached the same conclusion and result in finding bloodstain pattern interpretation as an appropriate area for expert testimony. *State v. Rodgers*, 119 Idaho 1047, 812 P.2d 1208 (1991); *Fox v. State*, 506 N.E.2d 1090 (Ind. 1987); *State v. Hall*, 297 N.W.2d 80 (Iowa 1980), *cert. denied*, 450 U.S. 927, 67 L. Ed. 2d 359, 101 S. Ct. 1384 (1981); *Farris v. State*, 670 P.2d 995 (Okla. Crim. App. 1983); *State v. Melson*, 638 S.W.2d 342 (Tenn. 1982), *cert. denied*, 459 U.S. 1137, 74 L. Ed. 2d 983, 103 S. Ct. 770 (1983); *Compton v. Commonwealth*, 219 Va. 716, 250 S.E.2d 749 (1979).

Next, we address defendant's specific assignment of error relating to the qualification of Agent Deaver as a purported expert in bloodstain pattern interpretation. First, our review of Agent Deaver's qualifications shows that he was properly qualified as an expert to testify in this area. The record indicates that Agent Deaver has extensive experience in the field of bloodstain pattern interpretation. The following testimony during the *voir dire* of Agent Deaver illustrates his background:

> Q. Have you been employed during your entire [career] with the Bureau in the position of a forensic serologist?
>
> A. Yes, I do have other assignments within the Bureau, but my specific title is a forensic serologist.
>
> Q. What is your educational background?
>
> A. I have a bachelor of science degree from North Carolina State University. At such time that I was employed with the SBI I was sent to the 17th SBI Academy where I was trained as a special agent. Upon completion of that course of study, I was then entered into the crime laboratory in an in-house training program for forensic serology. In the middle of that course of study, I was asked to take on an additional expertise which was blood spatter interpretation[,] which I accepted[,] and I was sent to schools also in that area to complete a course of study in that area. I have been sent to various areas throughout the United States for training. To the University of New Haven in Connecticut in serology. I was sent for training in blood spatter pattern interpretation or blood stain analysis to the Mid-Western Association of Forensic Science. That course was put on by the Minnesota Bureau of Criminal Apprehension. That was a basic course. After completion of that course I was sent to an advanced course offered by Valencia College in Florida. I then, during that period of time[,] completed my serology training and began course work in the area of serology and also blood stain pattern interpretation.
>
> Since that time I have been involved in the SBI with the specialized crime scene team that goes out and investigates homicides. I'm also an instructor for the State of North Carolina certified in the area of law enforcement instruction. I do teach about serology and blood stain pattern interpretation for the State of North Carolina to SBI agents, responsible for criminal training of North Carolina State Highway Patrol, and also

for local agencies, I provide training for Sheriff's Departments and Police Departments throughout the State of North Carolina.

Further, the trial court reasonably could have believed that Agent Deaver's experience and research placed him in a better position than the jury to testify regarding bloodstain pattern interpretation. Thus, the trial court did not err in qualifying Agent Deaver as an expert in this area.

Defendant also specifically challenges Agent Deaver's testimony concerning his opinion as to the lack of blood on defendant. The pertinent portion of the objectionable testimony proceeded as follows:

> Q. Agent Deaver, do you have an opinion satisfactory to yourself based on your experience and examination of the items that you've seen in this case whether or not you would necessarily exclude a certain individual as a participant in a stabbing type of assault simply because such person did not have any visible blood stains on his clothing?
>
> [DEFENSE COUNSEL]: Objection.
>
> THE COURT: Overruled.
>
> A. Yes, I do have an opinion to that.
>
> Q. What is the basis for your opinion?
>
> A. The basis for my opinion first, in general terms would be my experience. My experience comes from having looked at a great number of scenes and also from having done testing involving beatings, shootings, and those type of things. And so my experience generally would be [sic] I would be able to answer that question in general terms. What I need [sic] to do in this specific case was to look at the specific circumstances surrounding this case to see what one might expect to find. What types of stain, who might have the stains on them or what might they be on in order to form an opinion as to this specific case.
>
> Q. To your satisfaction, have you been able to examine all those areas?
>
> A. Yes, I have.
>
> Q. Agent Deaver, I then ask your opinion about whether you could necessarily exclude someone simply because they did not have blood on them?
>
> A. Generally, I would not. I have seen enough cases where I have been able to reconstruct the circumstances that were given to me and was able to determine that bloodstain did not occur as one might expect from an individual involving those circumstances. Specifically, in this case, after having looked at these items of evidence, the crime scene and the autopsy, again my opinion would be that one could not be

excluded from having inflicted at least some of the injuries on these individuals simply because they do not have blood staining on their clothes.

There is no doubt this testimony is critical to defendant, as it relates directly to the issue of whether the defendant actually participated in the murders. Although defendant admitted his presence at the time the murders were committed, he denied participation in the stabbing deaths. Defendant contends that the testimony of Agent Deaver was "totally unnecessary and thus inadmissible under Rule 702," as the jury could have reached its own conclusions on the matter. However, the testimony of Agent Deaver prior to the above statements clearly shows that he was in a better position than the jury to draw conclusions from the presence or absence of blood on defendant.

Q. . . . Agent Deaver, if you would, can you describe for the members of the jury in the court the factors that determined whether or not blood stain occurs.

A. Well, there has to first--it may seem fairly simple but there has to be a source of blood present. . . . In other words, there can be a tremendous fight or injuries [of] some kind that blood stain does not occur, blood spatter interpretation is not worthwhile. . . .

. . . Very rarely does an initial injury create blood stains either on anything that's present in the crime scene or anything around it--around the injuries themselves. That's true of gun shots, it's true of beatings, it's true of stabbings, it's true of most injuries. Because one must remember that a body is not, for instance, I use this example, a water balloon is filled with blood. It doesn't instantly explode when punctured creating blood stains.

What happens is that an injury creates internal injuries that create blood. We have a vascular system, made up of arteries, veins, heart, those type of things. When they are injured, then the blood stain begins to occur. And that blood stain occurs internally first. If one, for instance, was to beat someone. You can beat a person in the head fairly severely for a while but until those internally [sic] injuries, injuries to the head or the brain cause blood to be on the outside of the head, you don't create blood stain. . . . You have to have a very traumatic injury.

Q. If I understand you correctly, it would have to be some blood or successive blows to come in contact with?

A. That's correct. I also, if I might, clothing is also important to this also. Not only are injuries internal but even when it comes to surface, if there's clothing present, it also prevents a lot of stains many times and, of course the amount of clothing, the type of clothing would indicate how much staining you could expect. . . .

Q. Any other factors that you're familiar [with] to the fact whether the blood stain will or will not occur?

A. Well, particular injuries, that's always very important. That's why I ask for autopsy reports so that I can see what type of injuries are present.

Thus, due to Agent Deaver's study of autopsy photographs in this case as well as in other cases, examination of the clothing of the victims and codefendants in this case as well as in other cases, and participation in the examination of crime scenes where bloodstains did occur and other cases where bloodstains did not occur, we conclude his testimony was properly admitted to aid the jury in making its determination.

In addition, the question of whether an absence of blood on defendant should exculpate him is clearly relevant to the case, as defendant's theory of the case is that he was at the scene of the crime as the murders were being committed but took no actual part in the killings. "Once properly admitted, the weight to be given the evidence was a decision for the jury." *State v. Whiteside*, 325 N.C. 389, 398, 383 S.E.2d 911, 916 (1989). Further, during defendant's cross-examination of Agent Deaver, he was able to elicit testimony that it is "certainly a possibility if you haven't been involved in violence of some kind you would expect that there would be no blood on you," which, in fact, supported defendant's version of the events occurring the night of the murder. Thus, not only did defendant have the opportunity to thoroughly cross-examine Agent Deaver regarding the absence of blood on defendant, but he was also able to elicit favorable testimony from him. Accordingly, defendant's assignment of error is without merit.

B.

Defendant's final specific assignment of error regarding bloodstain pattern interpretation is that his due process rights were violated because he was not given adequate notice of the expert's report and was, therefore, unable to conduct a meaningful cross-examination.

N.C.G.S. § 15A-903(e) provides:

> (e) Reports of Examinations and Tests. - Upon motion of a defendant, the court must order the prosecutor to provide a copy of or to permit the defendant to inspect and copy or photograph results or reports of physical or mental examinations or of tests, measurements or experiments made in connection with the case, or copies thereof, within the possession, custody, or control of the State, the existence of which is known or by the exercise of due diligence may become known to the prosecutor. In addition, upon motion of a defendant, the court must order the prosecutor to permit the defendant to inspect, examine, and test, subject to appropriate safeguards, any physical evidence, or a sample of it, available to the prosecutor if the State intends to offer the evidence, or tests or experiments made in connection with the evidence, as an exhibit or evidence in the case.

N.C.G.S. § 15A-903(e) (1988).

The record reflects the fact that on 27 October 1993, four days prior to trial, the prosecution informed counsel for the defense of its intention to have certain pieces of evidence examined in order to develop expert opinion. The expert's written report was given to the

State on 8 November 1993 and turned over to the defense late that afternoon. Four days later a *voir dire* of Agent Deaver was conducted. The court then recessed for a day, and the judge delayed ruling on the admission of the bloodstain pattern interpretation testimony in order to give defense counsel time to research the issue. The court concluded that the State had turned over the report by Agent Deaver as required by N.C.G.S. § 15A-903(e). Agent Deaver's testimony was delayed while the State called two other witnesses. At this point, the court offered another recess in order for defendant to locate an expert witness. Defense counsel stated, "To tell you the truth, I don't know that we really need any recess. We've called everybody I could get up with, and nobody knows anybody, private detectives or the Death Penalty Resource Center or even other lawyers." A ten-minute recess was given after which defense counsel elected to hold a *voir dire* on Agent Deaver's qualifications. Trial then continued, and the complained-of evidence was offered.

In a similar case, *State v. McCoy*, 303 N.C. 1, 277 S.E.2d 515 (1981), this Court found no error where the State did not provide ballistics test results to the defendant until the third day of trial. In *McCoy*, as in this case, the State was not aware of the evidence until several days prior to trial and immediately notified defendant's counsel. Also in that case the defense counsel noted, "I've looked for ballistics experts before and there are just not any," and doubted that he could locate such an expert within a reasonable time. *Id.* at 21, 277 S.E.2d at 530.

"We find no error in this procedure. Even if we assume, for purposes of argument, that the State failed to comply with the discovery statute, exclusion of evidence is but one of several sanctions authorized by N.C.G.S. § 15A-910. Another is to 'grant a continuance or recess.'" *Id.* "The sanction to be imposed rests in the trial judge's sound discretion and, absent abuse, is not reviewable on appeal." *Id.* (citing *State v. Hill*, 294 N.C. 320, 240 S.E.2d 794 (1978); *State v. Thomas*, 291 N.C. 687, 231 S.E.2d 585 (1977)). Given that the prosecutor notified defendant of the evidence four days before trial and knew of it himself no sooner, the trial court's ordering a recess to permit defendant to locate material on the subject or another expert **[***35]** witness was well within the due exercise of the discretion permitted the court under the circumstances. This assignment of error is overruled.

. . . . We hold that defendant received a fair trial and sentencing proceeding, free of prejudicial error.

NO ERROR.

The following excerpts from *Howerton v. Arai* are relevant to N.C.R. Evid. 702.

W. BRUCE HOWERTON, JR., DDS v. ARAI HELMET, LTD., a Japanese Corporation; ARAI HELMET, LTD., a New Jersey Corporation; and TOM BRISSEY

No. 383PA03

FILED: 25 JUNE 2004

Justice PARKER concurring in part and dissenting in part.

Justice BRADY did not participate in the consideration or decision of this case.

On discretionary review pursuant to N.C.G.S. § 7A-31 of a unanimous decision of the Court of Appeals, 158 N.C. App. 316, 581 S.E.2d 816 (2003), affirming an order for summary judgment entered 1 March 2002 by Judge Wade Barber in Superior Court, Orange County. Heard in the Supreme Court 17 February 2004.

Womble Carlyle Sandridge & Rice, PLLC, by Burley B.Mitchell, Jr., Richard T. Rice, and Alison R. Bost, for plaintiff-appellant.

Ellis & Winters LLP, by Richard W. Ellis, Matthew W. Sawchak, and Andrew S. Chamberlin; and Wilson Elser Moskowitz Edelman & Dicker, by James C. Ughetta, pro hac vice, for defendants-appellees.

Jeff Hunt on behalf of the North Carolina Conference for District Attorneys, amicus curiae.

Twiggs, Beskind, Strickland & Rabenau, P.A., by Howard F. Twiggs, Donald H. Beskind, and Jerome P. Trehy, Jr.; and Robert P. Mosteller, on behalf of the North Carolina Academy of Trial Lawyers, amicus curiae.

Nelson Mullins Riley & Scarborough, L.L.P., by George Major Teague; Robinson, Bradshaw & Hinson, P.A., by John Robbins Wester and Scott William Gaylord; and Bailey & Dixon, L.L.P., by Gary S. Parsons, on behalf of the North Carolina Citizens for Business and Industry and the North Carolina Association of Defense Attorneys, amici curiae.

Smith Moore LLP, by J. Donald Cowan, Jr., and Dixie Wells, on behalf of the Product Liability Advisory Council, Inc., amicus curiae.

WAINWRIGHT, Justice.

On 5 October 1996, plaintiff, W. Bruce Howerton, Jr., D.D.S. (“Howerton”), suffered a devastating motorcycle accident while riding his off-road motorcycle at a motocross practice

track in western North Carolina. Howerton was an experienced off-road motorcycle enthusiast who had been riding motorcycles since he was a child. He had owned numerous motorcycles throughout his life and was knowledgeable in the technical aspects of motorcycles and motorcycle equipment.

The motocross track on which Howerton rode the day of the accident was a winding dirt course with numerous jumps and obstacles. Howerton wore typical motocross safety gear, including riding boots, knee braces, gloves, and an Arai "MX/a" motorcycle helmet. While jumping a course obstacle known as a "table top," Howerton landed atop another motorcycle rider who had entered the landing area of the jump perpendicular to Howerton's line of travel. The two motorcycles became entangled on impact, causing Howerton's motorcycle to stop abruptly and launching Howerton into an airborne somersault over the handlebars of his motorcycle. Howerton landed upside down on the back of his helmeted head, breaking the chin guard attached to his helmet and forcing his chin downward into his chest. As he landed, Howerton experienced what he described as severe popping, crunching, and pain in his neck. Lying in the dirt, Howerton struggled to breathe and was unable to move his legs; he immediately recognized the severity of his injuries. Paramedics were summoned and Howerton was transported to the hospital by helicopter. As a result of his accident, Howerton sustained debilitating cervical vertebral fractures at the C5/C6 level that left him a quadriplegic, permanently paralyzed from the neck down.

On 4 October 1999, Howerton brought actions against the other motorcycle rider, the owners of the motocross track, and Arai Helmet, Ltd., the manufacturer of the motorcycle helmet Howerton was wearing when the accident occurred. Our review of this matter concerns only Howerton's claims against Arai. Howerton's products liability claims against Arai set forth various theories of negligence and breach of implied and express warranties. Howerton alleged, among other things, that Arai negligently designed, manufactured, and promoted a helmet that was unreasonably dangerous under ordinary usage and that such negligence was the direct and proximate cause of his quadriplegia. Howerton further claimed that Arai breached both express and implied warranties by manufacturing a defective helmet and by failing to provide adequate warnings of its dangerous condition. On 13 August 2001, Howerton amended his complaint to include a claim that Arai intentionally engaged in a campaign to deceptively advertise and market the allegedly defective helmet, thereby engaging in an unfair and deceptive trade practice in violation of N.C.G.S. § 75-1.1.

The Arai "MX/a" helmet worn by Howerton on the day of his accident was equipped with a flexible, removable guard across the chin and mouth that was secured to the helmet on each side by nylon screws. By comparison, many other helmets are designed with a rigid, integral chin bar that is structurally molded into the helmet. In addition to protecting the motorcyclist's mouth and nose area from debris, some of these rigid guards are purportedly designed to increase the strength and stability of the motorcyclist's neck upon impact by preventing the neck from rotating too far forward. Such a chin guard limits the forward rotation of the head by stopping against the motorcyclist's chest, protecting the head and neck from extreme forward rotation.

The purpose of the guard on the specific Arai "MX/a" helmet worn by Howerton on the day of his accident is subject to conflicting characterizations which lie at the heart of this litigation. Howerton complains that the chin guard on his Arai helmet should have restricted the movement of his neck like a rigid chin guard and cushioned his head on impact so as to prevent the catastrophic spinal injury which he suffered. Howerton alleges that when the nylon screws securing the chin guard to his helmet broke on impact, his head was allowed to rotate too far forward, beyond its normal anatomical range, resulting in a "hyperflexion" of his neck which caused the resulting cervical fractures and paralysis. Howerton additionally claims that Arai's advertising and marketing led him to believe that the helmet provided superior neck protection, when in fact it did not, and that Arai failed to warn him that its chin guard would neither withstand nor protect against the physical forces Howerton experienced in his motorcycle accident.

According to Arai, however, "[t]he intended function of the mouth guard on the MX/a helmet is to prevent pebbles, dirt and small branches from contacting that part of the rider's face behind the mouth guard while riding off-road or in wooded areas." Arai insists that its breakaway rock guard was never designed "to function as an integral part of a full face helmet and was never intended to offer the same degree of facial protection . . . in the full range of possible motorcycle accidents." Rather, Arai contends that the chin guard on its helmet was intentionally designed to bend or break away on impact so as to minimize excessive and dangerous torquing of the neck.

To prove the alleged defectiveness of his Arai helmet and its causal connection to his injuries, Howerton offered the opinion testimony of four key expert witnesses:

(1) Professor Hugh H. Hurt, Jr. is an expert in motorcycle accidents and motorcycle helmets. Professor Hurt is President of the Head Protection Research Laboratory of Southern California and Professor Emeritus of Safety Science at the University of Southern California. Professor Hurt has researched and published extensively in the field of motorcycle accidents and motorcycle helmet safety for more than twenty-five years. Based upon Professor Hurt's extensive credentials, Arai stipulated that he is qualified as an expert pursuant to North Carolina Rule of Evidence 702. Professor Hurt's opinion was that the flexible chin guard on Howerton's Arai helmet was defectively designed and manufactured such that it broke loose on impact and failed to limit the forward rotation of Howerton's head. Instead of stopping the chin against the sternum, as a rigid chin guard would do, Professor Hurt opined that the flexible chin guard on Howerton's Arai helmet broke on impact, allowing Howerton's neck to flex towards the chest, beyond its normal range of movement. Finding the chin guard on the Arai helmet to be "flexible and weak," Professor Hurt was further of the opinion that the Arai helmet's apparent similarity to other motorcycle helmets with structurally rigid chin guards created a "misleading and dangerous" "illusion of protection."

(2) William C. Hutton, D.Sc. is an expert in biomechanics and orthopaedic biomechanics. Dr. Hutton is Professor and Director of Orthopaedic Research at Emory University School of Medicine. He is widely published and has over thirty-five years of experience in the fields of biomechanics, orthopedic research, and spinal injuries. Dr. Hutton's opinion was that the flexible chin guard on Howerton's Arai helmet broke and allowed Howerton's head and neck to travel

beyond their normal range of motion, causing the hyperflexion and compression that resulted in Howerton's paralysis.

(3) James Randolph Hooper is an expert in the design and manufacture of composite materials such as those found in motorcycle helmets. Hooper worked as a design engineer on the development of other full-face, off-road motorcycle helmets and is personally experienced with off-road motorcycles and motorcycle accidents. Hooper's opinion was that the flexible chin guard on Howerton's Arai helmet offered no protection on impact and, in fact, created a considerable hazard due to its flexible nature. Hooper further opined that the chin guard on Howerton's Arai helmet was known to detach on impact and lacked the protective features typical of helmets with rigid chin guards.

(4) Charles Edward Rawlings, III, M.D. is a board certified neurosurgeon. With more than ten years of neurosurgical experience, Dr. Rawlings has conducted numerous spinal surgeries on patients with cervical fractures similar to the one sustained by Howerton. Although Dr. Rawlings was not Howerton's treating neurosurgeon, Dr. Rawlings reviewed Howerton's medical records and opined that Howerton suffered a flexion-compression injury that was the cause of his paralysis.

On 7 January 2002, Arai filed its "Omnibus Motion for Summary Judgment on All Claims and Motion to Exclude Testimony of Plaintiff's Experts on the Issue of Causation." In this motion, Arai argued that:

> Plaintiff must prove that his injuries were caused by the product at issue. In this complex product liability case, Plaintiff cannot meet this burden absent admissible expert testimony on the issue of causation. Four of Plaintiff's experts, Dr. Charles Rawlings, Dr. William Hutton, Mr. Hugh H. Hurt and Mr. Randolph Hooper, have attempted to offer expert opinion testimony supporting Plaintiff's case on this issue [of causation]. None of these experts have performed testing relevant to the causation issues in this case. None have undertaken independent research to support their hypotheses or subjected their hypotheses to peer-review via publication. Each has relied on inadequate or non-existent data that renders their opinions subject to an unreasonably high rate of error. Finally, none of these expert[s] have been able to demonstrate that their opinions are generally accepted within their own fields. In fact, many of the opinions expressed by these experts are contrary to the existing body of medical or biomechanical research. In some cases, the opinions expressed by these experts are in conflict with one another, or in conflict with their own previously published opinions. Accordingly, the Arai Defendants move that the opinions of Plaintiff's experts be held inadmissible at trial pursuant to Rule 104 and Rule 702 of the North Carolina Rules of Evidence and the related authorities of the North Carolina courts and United States Supreme Court. Further, that the Court award the Arai Defendants summary judgment on all claims based on the inability of Plaintiff to offer admissible evidence of causation.

On 29 January 2002, the trial court conducted a brief hearing on the matter, considering arguments from counsel, discovery materials, and pleadings. The trial court did not, however, hear live voir dire testimony from the experts.

On 1 March 2002, the trial court granted Arai's motion to exclude the testimony of Howerton's experts on the issue of causation. With respect to each of Howerton's four experts, the trial court made the following findings of fact:

Professor Hugh H. Hurt, Jr.

16. Professor Hugh Hurt is a helmet expert from California. He opined that a full-face helmet equipped with an integrated chin bar would have prevented plaintiff's injury.

17. Professor Hurt's opinion was based on the assertion that he had noticed red "u" or "v" shaped marks on the chests of three motorcycle riders who were involved in motorcycle accidents while wearing full-face helmets. The necks of the three riders were not broken, however, two of these riders were killed in the accidents at issue. Professor Hurt deduced that these marks were caused by the rigid integrated chin bars on the riders' full-face helmets striking their chests during the accident, and concluded that this may have prevented a neck injury.

18. Professor Hurt explained the basis of his opinion that the marks on the chests of three riders proves that rigid chin bars prevent neck injuries as follows: "like Bo knows baseball, Hurt knows motorcycle accidents."

19. Professor Hurt could not quantify the extent to which a full-face helmet would prevent forward flexion of the head and neck.

20. Professor Hurt did not test or perform independent research on his hypothesis that full-face helmets equipped with rigid chin bars prevent neck injuries. He did not subject his hypothesis to peer review by publishing it to his peers.

21. Professor Hurt did not report his hypothesis to the United States government, for whom he conducted extensive studies that included work on motorcycle helmet safety.

22. Professor Hurt was not able to identify any published work by any author that expressly supported his hypothesis and, thus, did not present any evidence other than his unsupported assertions that his hypothesis is generally accepted in his field.

23. Indeed, Professor Hurt's published work did not support -- and in fact tends to contradict -- his hypothesis that full-face helmets prevent neck injuries. In a University of Southern California report published in 1981, Professor Hurt published data indicating that serious neck injuries occurred more frequently in

riders wearing full-face helmets than in riders wearing full coverage helmets (i.e., open-face helmets that were not equipped with chin bars.).

24. Professor Hurt also opined that the MX/a design provided superior head protection, and that open-face helmets, that is, helmets without chin bars, are not defective.

25. Professor Hurt's opinion that a full-face helmet would have prevented plaintiff's injury is speculative and based on inadequate data.

26. Professor Hurt's opinion that a full-face helmet would have prevented plaintiff's injury is not reliable. Professor Hurt's opinion was not developed through sound scientific or engineering methods. Professor Hurt has not performed relevant testing or independent research and has not subjected his hypothesis that full face helmets prevent neck injuries to peer-review by publishing that claim. Further, he was unable to demonstrate that his hypothesis is generally accepted in his field by pointing to any published support for his claim. Finally, to the extent that his methods represent a technique, it is clear that this technique is subject to an unacceptably high risk of error.

James Randolph Hooper

27. Mr. Randolph Hooper was proffered by plaintiff as an expert based on his role in the design and manufacture of a motorcycle helmet in the late 1970's and early 1980's. Like Professor Hurt, Mr. Hooper also opined that a full-face helmet with integrated chin bar would have prevented plaintiff's injury.

28. Mr. Hooper is not a medical doctor, an accident reconstructionist, an expert in biomechanics, or an engineer. He does not have a college degree.

29. When deposed, Mr. Hooper expressly conceded that he did not have the expertise to opine that a full-face helmet equipped [with] an integrated chin bar would have prevented plaintiff's injury.

30. Nevertheless, Mr. Hooper was willing to testify about his own history of motorcycle accidents involving full-face helmets for the apparent purpose of supporting the inference that a full-face helmet would have prevented plaintiff's injury.

31. However, Mr. Hooper was admittedly unaware of the salient details of plaintiff's accident. In addition, he was unable to relate the specific details of his own accidents.

32. Mr. Hooper is not qualified to offer the opinion that a full-face helmet would have prevented plaintiff's injury in this case. His opinion that a full-face helmet would have prevented plaintiff'[s] injury was speculative and based on inadequate

data. Further, Mr. Hooper did not have a reliable basis to offer any meaningful comparison between his own history of accidents and plaintiff's accident. Dr. Charles Rawlings

33. Dr. Charles Rawlings is a neurosurgeon. Dr. Rawlings currently is attending law school and has not actively practiced neurosurgery on a full time basis since at least January of 2000.

34. Dr. Rawlings has never performed independent research or testing on the mechanisms of cervical fractures. He has never published any medical article on the mechanisms of cervical fracture. He has never published on hyperflexion neck injuries.

35. Dr. Rawlings opined that plaintiff suffered no injuries, including his paralysis, prior to the time his head rotated forward beyond the normal range of motion.

36. When deposed Dr. Rawlings admitted that the medical literature does identify a "hyperflexion" injury of the cervical spine. Dr. Rawlings conceded that the hallmark features of hyperflexion injuries include bilateral or unilateral locked facets. He further conceded that plaintiff's injury did not involve bilateral or unilateral locked facets.

37. Due to the absence of these features, Dr. Rawlings defined plaintiff's injury as a flexion-compression injury. Dr. Rawlings nevertheless opined that eighty percent of all compression-flexion injuries involve hyperflexion. However, Dr. Rawlings was unable to identify any published medical literature that supports this claim.

38. Dr. Rawlings never examined plaintiff and reviewed only a selected portion of his medical records. Although Dr. Rawlings offered opinions based on efforts to compare plaintiff's accident to the accidents experienced by patients in his practice, he did not have adequate data to make such a comparison. To the extent that this represented a medical technique, if at all, it incorporated an unacceptably high potential for error.

39. Dr. Rawlings also opined based on plaintiff's radiology films that plaintiff's head rotated ten to twenty degrees beyond his normal anatomical range. However, he conceded that he has never published his claimed ability to draw such conclusions from radiology films. Nor could he cite any published authority supporting the conclusion that such an estimate can be accurately derived from medical records or radiology films. Dr. Rawlings further testified that a body of scientific literature may exist that addresses head rotation with respect to neck injury, but conceded that he had made no effort to research this literature.

40. Dr. Rawlings made no attempt to validate his hypothesis that plaintiff's head

rotated ten to twenty degrees beyond his normal anatomical range. He could not point to any tests, measurements or literature supporting his opinion on this point.

41. Dr. Rawlings was unable to offer any medically reliable opinion on the extent to which plaintiff's head may have been rotated forward at impact. He conceded that unless the amount of force is known, it is impossible to distinguish one degree and forty-five degrees of flexion based on radiology films. Dr. Rawlings conceded that he did not know the amount of force involved in this accident. Dr. Rawlings acknowledged that he had no medical basis to opine about whether plaintiff's head was rotated forward in flexion five degrees or forty-five degrees at impact.

42. Even though he did not know the force involved in the accident and could not accurately identify the position of plaintiff's head at impact, Dr. Rawlings opined that plaintiff would not have been paralyzed but for his head rotating forward beyond the normal anatomical range of motion. He admitted, however, that there are no objective criteria that can be used to confirm this hypothesis. Nor could he point to any medical literature indicating that it is possible to state whether a particular patient would be paralyzed based on a given set of variables.

43. Dr. Rawlings opined that plaintiff experienced an anterior teardrop fracture of C5 and that this feature was indicative of a hyperflexion mechanism. This opinion was generally inconsistent with the testimony of the treating neurosurgeon who used the anterior face of C5 as a site to attach a metal plate to fuse plaintiff's vertebra and was in a superior position to judge its condition. Dr. Rawlings' claim that C5 was the only possible source of the bone fragment at issue is contrary to the report of the attending radiologist. In any event, the Arai defendants presented evidence that even if a teardrop fracture occurred, fractures of this type are not specific to hyperflexion injury mechanisms.

44. Dr. Rawlings' opinion that plaintiff's injury was caused by hyperflexion is speculative and based on inadequate data.

45. Dr. Rawlings' opinion that plaintiff's injury was caused by hyperflexion is not reliable. Dr. Rawlings' opinion was not based on sound scientific or medical methods. He has not performed independent research or testing on cervical injury mechanisms or on hyperflexion. He has never subjected his related hypotheses to peer-review by publication. Moreover, the hypotheses underlying Dr. Rawlings' opinion are not generally accepted. Finally, to the extent that his methods represent a technique, it is clear that his potential for error is inappropriately high.

Dr. William Hutton

46. Dr. William Hutton was proffered as an expert in the field of biomechanics. He is not a medical doctor.

> 47. Dr. Hutton opined, among other things, that at some point after the initiation of the fracture of plaintiff's neck, his head and neck moved forward beyond the normal range of motion. He further opined that this hyperflexion caused the bone fragments to be retropulsed further into the spinal canal.
>
> 48. Dr. Hutton conceded, however, that he has never researched, tested or published his hypothesis that the degree of retropulsion of bone fragments is a function of the degree of flexion or hyperflexion involved. He could cite no medical or scientific literature in support of this position. Dr. Hutton also conceded that retropulsion of bone fragments can occur in the absence of hyperflexion. Further, he acknowledged that plaintiff could have sustained some degree of retropulsion even if he had been wearing a full-face helmet. Finally, he conceded that he does not know how much retropulsion the spinal cord can withstand before paralysis occurs.
>
> 49. Dr. Hutton admitted that he had never dealt with a cervical injury similar to that experienced by plaintiff.
>
> 50. Dr. Hutton admitted that he could not identify any literature that supported the conclusion that plaintiff would not have been paralyzed but for hyperflexion.
>
> 51. Dr. Hutton's opinion that plaintiff's injuries were caused by hyperflexion is speculative and based on inadequate data.
>
> 52. Dr. Hutton's opinion that plaintiff's injuries were caused by hyperflexion is not reliable. Dr. Hutton has not researched or tested the hypotheses that he relies on in support of his opinion. He has not subjected these hypotheses to peer-review by publication. Nor has he demonstrated that these hypotheses are generally accepted in the field. To the extent that his methods represent a technique, it is clear that they incorporate an unacceptably high rate of error.

Based upon these findings of fact, the trial court excluded the testimony of all of Howerton's causation experts, ruling in relevant part that:

> 1. North Carolina has adopted *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993). *See State v. Goode*, 341 N.C. 513, 527, 461 S.E.2d 631, 639 (1995); *see also State v. Bates*, 140 N.C. App. 743, 748, 538 S.E.2d 597, 600 (2000).
>
> 2. Even before the issuance of the *Daubert* decision, North Carolina courts adopted "reliability" as the touchstone of admissibility for expert opinion testimony as demonstrated in *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990). The indicia of reliability identified by the North Carolina Supreme Court in *Pennington* are consistent with the indicia of reliability found in *Daubert*. The opinions expressed by plaintiff's experts fail under either analysis.

> 3. The inquiry of the Court is not limited to the qualifications of the experts. Implicit in Rule 702 of the North Carolina Rules of Evidence is the precondition that the matters or data upon which an expert bases his opinion be recognized in the scientific community as sufficiently reliable and relevant. *Davis v. City of Mebane*, 132 N.C. App. 500, 503, 512 S.E.2d 450, 452 (1999), *rev. dismissed as improvidently granted*, 351 N.C. 329, 524 S.E.2d 569 (2000). The test of reliability involves a preliminary assessment of whether the reasoning or methods at issue are sufficiently valid. *Goode*, 341 N.C. at 527, 461 S.E.2d at 639 (citing *Daubert*).
>
> 4. The Court, in its discretion, has concluded that Professor Hurt's opinion that a full-face helmet design would have prevented plaintiff's injury is unreliable and inadmissible.
>
> 5. The Court, in its discretion, has concluded that Mr. Hooper is not qualified to offer the opinion that a full-face helmet would have prevented plaintiff's injury. The Court further concludes that his opinion on this issue is based on inadequate data and is otherwise unreliable and inadmissible.
>
> 6. The Court, in its discretion, has concluded that Dr. Rawlings' opinion that plaintiff's injuries were caused by hyperflexion is unreliable and inadmissible.
>
> 7. The Court, in its discretion, has concluded that Dr. Hutton's opinion that plaintiff's injuries were caused by hyperflexion is unreliable and inadmissible.
>
> 8. After reviewing all of the relevant materials submitted by the parties, and based on the preceding findings of fact and conclusions of law, the Court, in its discretion, concludes that the above-cited opinions of Professor Hurt, Mr. Hooper, Dr. Rawlings and Dr. Hutton, should be excluded from the trial of this matter.

With the testimony of each of his causation experts excluded on the basis of the federal standard set forth in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed. 2d 469 (1993), Howerton was without any admissible evidence to establish a prima facie case that his injuries were caused by Arai's allegedly defective helmet. Thus, the trial court granted summary judgment in favor of Arai:

> 1. In its Order on Arai Defendants' Motion to Exclude the Testimony of Plaintiff's Experts, this Court, in its discretion, found that the opinion testimony of Dr. Charles Rawlings, Dr. William Hutton, Professor Hugh Hurt, and Mr. Randolph Hooper, offered on the issue of causation, is unreliable under the standards set out in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993), and/or *State v. Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990). As a result, this Court found that the opinion testimony of the above witnesses is inadmissible. In the absence of reliable expert opinion testimony on the issue of causation, the Court finds that plaintiff has

> failed to offer evidence sufficient to raise a material issue of disputed fact as to the element of causation. On that basis, the Arai defendants are entitled to judgment as a matter of law on all claims, and accordingly their motion for summary judgment is hereby GRANTED.

Additionally, the trial court granted Arai's motion for summary judgment with respect to Howerton's claim of unfair and deceptive trade practices and granted Arai's motion for summary judgment with respect to Howerton's claim that Arai failed to adopt a safer, feasible design alternative as required under N.C.G.S. § 99B-6, which sets forth statutory guidelines for products liability claims based on inadequate design or formulation.

On 5 March 2002, Howerton gave Notice of Appeal to the North Carolina Court of Appeals, arguing, among other things, that: (1) the trial court erred in its reliance upon and application of *Daubert* to exclude the expert testimony advanced by Howerton; (2) the trial court erred by concluding that Howerton's unfair and deceptive trade practices claim failed as a matter of law; and (3) the trial court erred by concluding that Howerton presented insufficient evidence to establish a prima facie claim that Arai unreasonably failed to adopt a safer, feasible design alternative.

The North Carolina Court of Appeals rejected all of Howerton's assignments of error and affirmed the order of the trial court in its entirety. *Howerton v. Arai Helmet, Ltd.*, 158 N.C. App. 316, 581 S.E.2d 816 (2003). As to Howerton's expert witnesses, the Court of Appeals ruled that North Carolina has adopted *Daubert* as the proper test for judging the admissibility of scientific expert testimony. *Id.* at 332, 581 S.E.2d at 826. Notably, the Court of Appeals held that:

> From a thorough review of our case law, it is eminently clear that North Carolina has adopted the *Daubert* analysis. This is not novel. *Daubert* has been the prevailing law in this state since *Goode*. Three years ago, in *Bates*, this Court expressly held that our Supreme Court in *Goode* adopted *Daubert*.

Id. Applying an abuse of discretion standard of review, the Court of Appeals evaluated the causation testimony of each of Howerton's four experts under the basic *Daubert* criteria and held that the trial court's decision to exclude all such testimony was neither arbitrary nor an abuse of discretion. *Id.* at 332-37, 581 S.E.2d at 827-30.

As to Howerton's claim of unfair and deceptive trade practices, the Court of Appeals held that the trial court properly granted summary judgment in favor of Arai. *Id.* at 340, 581 S.E.2d at 831. The court found that, even if Arai had engaged in the allegedly unfair and deceptive advertising, Howerton failed to establish that he had relied on such advertising to his detriment or that such advertising was the proximate cause of his injuries. *Id.* at 338-40, 581 S.E.2d at 830-31.

Finally, with respect to Howerton's claim that Arai failed to adopt a safer, feasible design alternative, the Court of Appeals likewise affirmed the order of the trial court granting summary judgment in favor of Arai, concluding in a footnote to its opinion that the evidence forecasted by

Howerton was insufficient to support a prima facie cause of action under N.C.G.S. § 99B-6. *Id.* at 337-38 n.13, 581 S.E.2d at 830 n.13.

On 21 August 2003, this Court allowed Howerton's petition for discretionary review. Among the issues raised by Howerton and which we now address are: (1) whether this Court has adopted the *Daubert* standard for determining the admissibility of expert testimony; (2) whether Howerton presented sufficient evidence to withstand summary judgment on his claim of unfair and deceptive practices; and (3) whether Howerton presented sufficient evidence to withstand summary judgment on his claim that Arai unreasonably failed to adopt a safer, feasible design alternative.

This case initially presents us with the question of whether North Carolina has adopted the federal standard under *Daubert v. Merrell Dow Pharmaceuticals* for ruling on the admissibility of expert testimony under North Carolina Rule of Evidence 702. The Court of Appeals held that we have impliedly done so and Arai argues that we should now expressly do so. For the reasons stated below, we reject both of these contentions.

Our consideration of this issue begins with an overview of the cases that have come to define the federal approach to the admissibility of expert testimony under Federal Rule of Evidence 702. In *Daubert v. Merrell Dow Pharmaceuticals*, the United States Supreme Court delineated the modern standard for admitting expert scientific testimony in federal trials. 509 U.S. 579, 125 L. Ed. 2d 469. For more than half a century prior to *Daubert*, however, federal courts relied upon the "general acceptance" test of *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), as the exclusive standard for the admission of expert testimony in federal courts. Under *Frye*, scientific expert testimony was admissible only when based upon "sufficiently established" principles which had gained "general acceptance in the particular field in which it belongs." *Id.* at 1014.

In *Daubert* the Supreme Court held that *Frye* had been superseded by Congressional enactment of the Federal Rules of Evidence. 509 U.S. at 587-89, 125 L. Ed. 2d at 479-80. Characterizing the general acceptance standard as both "rigid" and "austere," the Court held that *Frye* was "at odds with the 'liberal thrust' of the Federal Rules and their 'general approach of relaxing the traditional barriers to "opinion" testimony.'" *Id.* at 588-89, 125 L. Ed. 2d at 480. Thus, the Court held that the *Frye* standard was no longer applicable in federal trials. *Id.* at 589, 125 L. Ed. 2d at 480.

While rejecting the general acceptance requirement of *Frye*, the Supreme Court nevertheless recognized inherent "limits on the admissibility of purportedly scientific evidence" and imposed upon trial courts an obligation to "ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable." *Id.* This directive is what is commonly referred to as the trial court's "gatekeeping" function. *Id.* at 597, 125 L. Ed. 2d at 485.

Under *Daubert*, then, the trial court is instructed to preliminarily determine "whether the reasoning or methodology underlying the [expert] testimony is scientifically valid and . . . whether that reasoning or methodology properly can be applied to the facts in issue." *Id.* at 592-93, 125 L. Ed. 2d at 482. The focus of the trial court's inquiry in this regard "must be solely on

principles and methodology, not on the conclusions that they generate." *Id.* at 595, 125 L. Ed. 2d at 484. In particular, the Supreme Court articulated five factors it considered important measures of scientific reliability: (1) Whether the scientific theory or technique upon which the expert's opinion is based "can be (and has been) tested." *Id.* at 593, 125 L. Ed. 2d at 483. (2) Whether the theory or technique employed by the expert "has been subjected to peer review and publication." *Id.* (3) The "known or potential rate of error" of the scientific technique. *Id.* at 594, 125 L. Ed. 2d at 483. (4) The "existence and maintenance of standards controlling the technique's operation." *Id.* (5) Whether the theory or technique is generally accepted within its relevant scientific community. *Id.* The Court noted that use of these factors was to be "flexible." *Id.* at 594, 125 L. Ed. 2d at 483-84.

In the years since *Daubert*, the United States Supreme Court has continued to refine the "gatekeeping" role of federal trial courts when ruling on the admissibility of expert testimony under Federal Rule of Evidence 702. In *General Electric Co. v. Joiner*, 522 U.S. 136, 139 L. Ed. 2d 508 (1997), the Court identified abuse of discretion as the proper appellate standard by which to review a federal trial court's decision to admit or exclude scientific expert testimony. *Id.* at 146, 139 L. Ed. 2d at 519. The Court additionally suggested that under the *Daubert* analysis it is permissible for a federal trial court to exclude expert testimony that, even though methodologically sound, nonetheless reaches questionable conclusions:

> [C]onclusions and methodology are not entirely distinct from one another. Trained experts commonly extrapolate from existing data. But nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.

Id.

In *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 143 L.Ed. 2d 238 (1999), the Court extended the effect of *Daubert* to any type of specialized expert testimony proffered under Federal Rule of Evidence 702, not just expert testimony that is scientific in nature. *Id.* at 147-49, 143 L. Ed. 2d at 249-51. In a concurring opinion, it was additionally forecasted that "failure to apply one or another of [the *Daubert* factors] may be unreasonable, and hence an abuse of discretion." *Id.* at 159, 143 L. Ed. 2d at 256-57 (Scalia, O'Connor, & Thomas, JJ., concurring). And more recently, in *Weisgram v. Marley Co.*, 528 U.S. 440, 145 L. Ed. 2d 958 (2000), the Court held that an appellate court may not only reverse a trial court's decision to admit expert testimony under *Daubert*, but that it may, instead of remand, direct the entry of judgment as a matter of law when it determines that expert testimony was erroneously admitted at trial and that the remaining evidence is insufficient to support a prima facie case. *Id.* at 457, 145 L. Ed. 2d at 973.

In light of this background on the admissibility of expert testimony under the federal rules, we now turn to North Carolina's established standard for admitting expert testimony and the specific issue of whether North Carolina has implicitly adopted the federal *Daubert* standard.

North Carolina Rule of Evidence 702 reads, in pertinent part:

> (a) If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion.

N.C.G.S. § 8C-1, Rule 702(a) (2003).

It is well-established that trial courts must decide preliminary questions concerning the qualifications of experts to testify or the admissibility of expert testimony. N.C.G.S. § 8C-1, Rule 104(a) (2003). When making such determinations, trial courts are not bound by the rules of evidence. *Id.* In this capacity, trial courts are afforded "wide latitude of discretion when making a determination about the admissibility of expert testimony." *State v. Bullard*, 312 N.C. 129, 140, 322 S.E.2d 370, 376 (1984). Given such latitude, it follows that a trial court's ruling on the qualifications of an expert or the admissibility of an expert's opinion will not be reversed on appeal absent a showing of abuse of discretion. *State v. Anderson*, 322 N.C. 22, 28, 366 S.E.2d 459, 463, *cert. denied*, 488 U.S. 975, 102 L. Ed. 2d 548 (1988); *Bullard*, 312 N.C. at 144, 322 S.E.2d at 378; *State v. Moore*, 245 N.C. 158, 164, 95 S.E.2d 548, 552 (1956) ("[T]his Court has uniformly held that the competency of a witness to testify as an expert is a question primarily addressed to the court, and his discretion is ordinarily conclusive, that is, unless there be no evidence to support the finding, or unless the judge abuse[s] his discretion."). The most recent North Carolina case from this Court to comprehensively address the admissibility of expert testimony under Rule 702 is *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995), which set forth a three-step inquiry for evaluating the admissibility of expert testimony: (1) Is the expert's proffered method of proof sufficiently reliable as an area for expert testimony? *Id.* at 527-29, 461 S.E.2d at 639-40. (2) Is the witness testifying at trial qualified as an expert in that area of testimony? *Id.* at 529, 461 S.E.2d at 640. (3) Is the expert's testimony relevant? *Id.* at 529, 461 S.E.2d at 641.

In the first step of the *Goode* analysis, the trial court must determine whether the expert's method of proof is sufficiently reliable as an area for expert testimony. *Id.* at 527-29, 461 S.E.2d at 639-40. As discussed in *Goode*, the requirement of reliability is nothing new to the law of scientific and technical evidence in North Carolina and, indeed, pre-dates the federal court's adoption of the *Daubert* standard. *See id.*; *see also State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990) ("A new scientific method of proof is admissible at trial if the method is sufficiently reliable."); *Bullard*, 312 N.C. at 149-53, 322 S.E.2d at 381-84, (discussing factors relevant in determining whether scientific methods in their infancy are reliable); *State v. Crowder*, 285 N.C. 42, 53, 203 S.E.2d 38, 46 (1974) (expert testimony based on scientific tests "competent only when shown to be reliable"), *vacated inpart on other grounds*, 428 U.S. 903, 49 L. Ed. 2d 1207 (1976).

Under *Goode*, to determine whether an expert's area of testimony is considered sufficiently reliable, "a court may look to testimony by an expert specifically relating to the reliability, may take judicial notice, or may use a combination of the two." 341 N.C. at 530, 461 S.E.2d at 641. Initially, the trial court should look to precedent for guidance in determining

whether the theoretical or technical methodology underlying an expert's opinion is reliable. Although North Carolina does not exclusively adhere to the *Frye* "general acceptance" test, *Pennington*, 327 N.C. at 98, 393 S.E.2d at 852, when specific precedent justifies recognition of an established scientific theory or technique advanced by an expert, the trial court should favor its admissibility, provided the other requirements of admissibility are likewise satisfied. *See, e.g., State v. Williams*, 355 N.C. 501, 553-54, 565 S.E.2d 609, 640 (2002) (recognizing the admissibility of DNA evidence and upholding its use as the basis of an opinion by a properly qualified expert in forensic DNA analysis), *cert. denied*, 537 U.S. 1125, 154 L. Ed.2d 808 (2003); *Goode*, 341 N.C. at 530-31, 461 S.E.2d at 641-42 (reliability of bloodstain pattern interpretation supported in part by prior appellate acceptance of such technique in North Carolina and other jurisdictions); *State v. Barnes*, 333 N.C. 666, 680, 430 S.E.2d 223, 231 (1993) (recognizing the long-established admissibility of the results of blood group testing for identification purposes), *cert. denied*, 510 U.S. 946, 126 L. Ed. 2d 336 (1993); *Pennington*, 327 N.C. at 100, 393 S.E.2d at 854 (finding persuasive authority in other jurisdictions' acceptance of DNA profiling); *State v. Rogers*, 233 N.C. 390, 397-98, 64 S.E.2d 572, 578 (1951) (recognizing that fingerprint evidence is an established and reliable method of identification), *overruled on other grounds by State v. Silver*, 286 N.C. 709, 213 S.E.2d 247 (1975).

Conversely, there are those scientific theories and techniques that have been recognized by this Court as inherently unreliable and thus generally inadmissible as evidence. *See, e.g., State v. Hall*, 330 N.C. 808, 820-21, 412 S.E.2d 883, 890 (1992) (concluding that "evidence that a prosecuting witness is suffering from post-traumatic stress syndrome should not be admitted for the substantive purpose of proving that a rape has in fact occurred" because of the unreliability of underlying psychiatric procedures used to diagnosis the condition); *State v. Peoples*, 311 N.C. 515, 533, 319 S.E.2d 177, 188 (1984) (holding that "hypnosis has not reached a level of scientific acceptance which justifies its use for courtroom purposes"); *State v. Grier*, 307 N.C. 628, 645, 300 S.E.2d 351, 361 (1983) (holding that polygraphs are inadmissible in any trial, even if otherwise stipulated to by the parties).

Where, however, the trial court is without precedential guidance or faced with novel scientific theories, unestablished techniques, or compelling new perspectives on otherwise settled theories or techniques, a different approach is required. Here, the trial court should generally focus on the following nonexclusive "indices of reliability" to determine whether the expert's proffered scientific or technical method of proof is sufficiently reliable: "the expert's use of established techniques, the expert's professional background in the field, the use of visual aids before the jury so that the jury is not asked 'to sacrifice its independence by accepting [the] scientific hypotheses on faith,' and independent research conducted by the expert." *Pennington*, 327 N.C. at 98, 393 S.E.2d at 852-53 (quoting *Bullard*, 312 N.C. at 150-51, 322 S.E.2d at 382), *quoted in Goode*, 341 N.C. at 528, 461 S.E.2d at 640. Within this general framework, reliability is thus a preliminary, foundational inquiry into the basic methodological adequacy of an area of expert testimony. This assessment does not, however, go so far as to require the expert's testimony to be proven conclusively reliable or indisputably valid before it can be admitted into evidence. In this regard, we emphasize the fundamental distinction between the admissibility of evidence and its weight, the latter of which is a matter traditionally reserved for the jury. *Queen City Coach Co. v. Lee*, 218 N.C. 320, 323, 11 S.E.2d 341, 343 (1940) ("The

competency, admissibility, and sufficiency of the evidence is a matter for the court to determine. The credibility, probative force, and weight is a matter for the jury. This principle is so well settled we do not think it necessary to cite authorities.").

Therefore, once the trial court makes a preliminary determination that the scientific or technical area underlying a qualified expert's opinion is sufficiently reliable (and, of course, relevant), any lingering questions or controversy concerning the quality of the expert's conclusions go to the weight of the testimony rather than its admissibility. *See, e.g.*, *Barnes*, 333 N.C. at 680, 430 S.E.2d at 231 (holding that a forensic serologist's failure to conduct or provide for additional, independent testing of blood samples went to the weight of the evidence, not its admissibility); *McLean v. McLean*, 323 N.C. 543, 556, 374 S.E.2d 376, 384 (1988) (concluding that deficiencies in the expert's methodology were relevant in considering the expert's credibility and the weight to be given his testimony, but that they did not render his opinion inadmissible). Here, we agree with the United States Supreme Court that "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." *Daubert*, 509 U.S. at 596, 125 L. Ed. 2d at 484; *accord Hairston v. Alexander Tank & Equip. Co.*, 310 N.C. 227, 244, 311 S.E.2d 559, 571 (1984) ("It is the function of cross-examination to expose any weaknesses in [expert] testimony . . . .").

In the second step of analysis under *Goode*, the trial court must determine whether the witness is qualified as an expert in the subject area about which that individual intends to testify. 341 N.C. at 529, 461 S.E.2d at 640. Under the North Carolina Rules of Evidence, a witness may qualify as an expert by reason of "knowledge, skill, experience, training, or education," where such qualification serves as the basis for the expert's proffered opinion. N.C.G.S. § 8C-1, Rule 702(a). As summarized in *Goode*,

> "It is not necessary that an expert be experienced with the identical subject matter at issue or be a specialist, licensed, or even engaged in a specific profession." "It is enough that the expert witness 'because of his expertise is in a better position to have an opinion on the subject than is the trier of fact.'"

341 N.C. at 529, 461 S.E.2d at 640 (citations omitted). "Whether a witness has the requisite skill to qualify as an expert in a given area is chiefly a question of fact, the determination of which is ordinarily within the exclusive province of the trial court." *State v. Goodwin*, 320 N.C. 147, 150, 357 S.E.2d 639, 641 (1987).

As pertains to the sufficiency of an expert's qualifications, we discern no qualitative difference between credentials based on formal, academic training and those acquired through practical experience. In either instance, the trial court must be satisfied that the expert possesses "scientific, technical or other specialized knowledge [that] will assist the trier of fact to understand the evidence or to determine a fact in issue." N.C.G.S. § 8C-1, Rule 702(a); *see* 2 Kenneth S. Broun, *Brandis & Broun on North Carolina Evidence* § 184, at 44-45 (6th ed. 2004) ("[A] jury may be enlightened by the opinion of an experienced cellar-digger, or factory worker, or shoe merchant, or a person experienced in any other line of human activity.

Such a person, when performing such a function, is as truly an 'expert' as is a learned specialist . . . ." (footnotes omitted)).

The third and final step under *Goode* concerns the relevancy of the expert's testimony. The trial court must always be satisfied that the expert's testimony is relevant. *Goode*, 341 N.C. at 529, 461 S.E.2d at 641. To this end, we defer to the traditional definition of relevancy set forth in the North Carolina Rules of Evidence: "'Relevant evidence' means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence." N.C.G.S. § 8C-1, Rule 401 (2003). As stated in *Goode*, "in judging relevancy, it should be noted that expert testimony is properly admissible when such testimony can assist the jury to draw certain inferences from facts because the expert is better qualified than the jury to draw such inferences." 341 N.C. at 529, 461 S.E.2d at 641.

We further note that, in addition to the foregoing principles of reliability under Rule 702, a trial court has inherent authority to limit the admissibility of all evidence, including expert testimony, under North Carolina Rule of Evidence 403, which provides that relevant evidence may nonetheless be excluded "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." N.C.G.S. § 8C-1, Rule 403 (2003); *see State v. Mackey*, 352 N.C. 650, 657, 535 S.E.2d 555, 559 (2000) ("[U]nder Rule 403 even relevant [expert] evidence may properly be excluded by the trial court if its probative value is outweighed by the danger that it would confuse the issues before the court or mislead the jury." (citations omitted)); *Newton v. New Hanover County Bd. of Educ.*, 342 N.C. 554, 565, 467 S.E.2d 58, 66 (1996) ("The expert's testimony, even if relevant, must also have probative value that is not substantially outweighed by the danger of unfair prejudice, confusion, or undue delay."). Whether to exclude expert testimony under Rule 403 is within the sound discretion of the trial court and will only be reversed on appeal for abuse of discretion. *Anderson*, 322 N.C. at 28, 366 S.E.2d at 463.

Based on our review of these well-settled principles of North Carolina law governing the admissibility of expert testimony under North Carolina Rule of Evidence 702, we are satisfied that our own approach is distinct from that adopted by the federal courts. Contrary to the conclusion of the Court of Appeals, it is not "eminently clear" that North Carolina adopted the *Daubert* standard. Such a bold proposition is neither confirmed by the case law of this Court nor buttressed by the "express holding" of the lower court in *State v. Bates*, 140 N.C. App. 743, 748, 538 S.E.2d 597, 600 (2000), *disc. rev. denied*, 353 N.C. 383, 547 S.E.2d 19 (2001), which was nothing more than a passing citation parenthetical suggesting without analysis or discussion that this Court had adopted *Daubert* in the *Goode* opinion.

In *Goode*, this Court made but one reference to *Daubert*:

> As recognized by the United States Supreme Court in its most recent opinion addressing the admissibility of expert scientific testimony, this requires a preliminary assessment of whether the reasoning or methodology underlying the testimony is sufficiently valid and

> whether that reasoning or methodology can be properly applied to the facts in issue. *See Daubert v. Merrell DowPharmaceuticals, Inc.*, ___ U.S. ___, 125 L. Ed. 2d 469 (1993).

341 N.C. at 527, 461 S.E.2d at 639. This was the first and the only time that this Court has ever referenced *Daubert* prior to our present analysis. We did so to underscore the generally acknowledged importance of preliminarily assessing the reliability of the reasoning or methodology underlying expert testimony.

As described above, however, our focus on reliability in this context had been developing under North Carolina case law for many years prior to *Daubert*. *See, e.g.*, *Bullard*, 312 N.C. at 150-54, 322 S.E.2d at 382-85 (ruling that expert testimony concerning footprint identification was reliable because of the expert's explanatory testimony, professional achievements, independent research, and use of scientifically established techniques); *State v. Temple*, 302 N.C. 1, 12, 273 S.E.2d 273, 280 (1981) (ruling that expert testimony concerning bite mark identification was reliable when such testimony was based upon the application of "scientifically established techniques of dentistry and photography to the solution of a particular novel problem"); *Crowder*, 285 N.C. at 53-54, 203 S.E.2d at 46 (ruling that the expert's use of flameless atomic absorption spectrophotometry to identify gunshot residue on defendant's hands was a reliable basis for testimony where the expert was experienced in the field of gunshot residue and had presented technical papers on the subject, and independent research verified the reliability of his testing methodology).

While these and other North Carolina cases share obvious similarities with the principles underlying *Daubert*, application of the North Carolina approach is decidedly less mechanistic and rigorous than the "exacting standards of reliability" demanded by the federal approach. *See Weisgram*, 528 U.S. at 455, 145 L. Ed. 2d at 972. Moreover, had we ever intended to adopt *Daubert* and supercede this established body of North Carolina case law, we would certainly have referenced the basic *Daubert* factors that have come to define the federal standard. But we did not.

We did not do so because we are not satisfied that the federal approach offers the most workable solution to the intractable challenge of separating reliable expert opinions from their unreliable counterparts, of distinguishing science from pseudoscience, or of discerning where in this "twilight zone" a "scientific principle or discovery crosses the line between the experimental and demonstrable stages." *Frye*, 293 F. at 1014. Obviously, there are no easy solutions to the inherent difficulties of determining the legal reliability of scientific and technical hypotheses. While the law works towards conclusiveness and finality, science operates on an evolving continuum of probabilities and likelihoods that, in many instances, is not consonant with the legal paradigm. In light of this dilemma, our challenge is to define a standard of admissibility that does not create more problems than it solves and that does not raise more questions than it answers.

One of the most troublesome aspects of the *Daubert* "gatekeeping" approach is that it places trial courts in the onerous and impractical position of passing judgment on the substantive merits of the scientific or technical theories undergirding an expert's opinion. We have great confidence in

the skillfulness of the trial courts of this State. However, we are unwilling to impose upon them an obligation to expend the human resources required to delve into complex scientific and technical issues at the level of understanding necessary to generate with any meaningfulness the conclusions required under *Daubert*. Indeed, this concern was adeptly described by the Ninth Circuit after *Daubert* had been remanded and again appealed:

> [T]hough we are largely untrained in science and certainly no match for any of the witnesses whose testimony we are reviewing, it is our responsibility to determine whether those experts' proposed testimony amounts to "scientific knowledge," constitutes "good science," and was "derived by the scientific method."
>
> The task before us is more daunting still when the dispute concerns matters at the very cutting edge of scientific research, where fact meets theory and certainty dissolves into probability. As the record in this case illustrates, scientists often have vigorous and sincere disagreements as to what research methodology is proper, what should be accepted as sufficient proof for the existence of a "fact," and whether information derived by a particular method can tell us anything useful about the subject under study.
>
> Our responsibility, then, unless we badly misread the Supreme Court's opinion, is to resolve disputes among respected, well-credentialed scientists about matters squarely within their expertise, in areas where there is no scientific consensus as to what is and what is not "good science," and occasionally to reject such expert testimony because it was not "derived by the scientific method."

Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1316 (9th Cir. 1995), *cert. denied*, 516 U.S. 869, 133 L. Ed. 2d 126 (1995). This same sentiment has been echoed in the writings of countless other courts and commentators. *See, e.g.*, *Ruiz-Troche v. Pepsi Cola of P.R. Bottling Co.*, 161 F.3d 77, 81 (1st Cir. 1998) (noting that "choreographing the *Daubert* pavane remains an exceedingly difficult task. Few federal judges are scientists, and none are trained in even a fraction of the many scientific fields in which experts may seek to testify."); *Zuchowicz v. United States*, 870 F. Supp. 15, 19 (D. Conn. 1994) ("[J]udges may not always have the 'special competence' to resolve complex issues which stand 'at the frontier of current medical and epidemiological inquiry.'" (citations omitted)); *Goeb v.Tharaldson*, 615 N.W.2d 800, 812-13 (Minn. 2000) (observing that "*Daubert* takes from scientists and confers upon judges uneducated in science the authority to determine what is scientific. This approach, which necessitates that trial judges be 'amateur scientists,' has also been frequently criticized." (citations omitted)); 29 Charles A. Wright & Victor J. Gold, *Federal Practice and Procedure* § 6266, at 271 (1997) ("It is unrealistic to think that courts can resolve disputes concerning the scientific validity of issues on the frontiers of modern science where even the experts may disagree. As a result, *Daubert* has been harshly criticized for imposing such a burden on the lower courts." (footnotes omitted)); George D. Marlow, *From Black Robes to White Lab Coats: The Ethical Implications of a Judge's Sua Sponte, Ex Parte Acquisition of Social and Other Scientific Evidence During the Decision-Making Process*, 72 St. John's L. Rev. 291, 333 (1998) (contending that "few judges possess the academic credentials or the necessary experience and training in scientific disciplines to separate competently high quality, intricate scientific research from research that is flawed").

When the United States Supreme Court jettisoned the "rigid 'general acceptance' requirement" of *Frye*, it did so in order to further the "'liberal thrust' of the Federal Rules and their 'general approach of relaxing the traditional barriers to "opinion" testimony.'" *Daubert*, 509 U.S. at 588, 125 L. Ed. 2d at 480. We believe that in practice, however, application of the "flexible" *Daubert* standard has been anything but liberal or relaxed and that trial courts, such as the one in the present case, have often been reluctant to stray far from the original *Daubert* factors in their analysis of the reliability of expert testimony. As expressed by one critic,

> Those who predicted that trial judges would flex their gatekeeper muscles to exclude vast quantities of plaintiffs' proposed expert causation opinion testimony in products liability cases have turned out to be right. The post-*Daubert* era can fairly be described as the period of "strict scrutiny" of science by non-scientifically trained judges.

Lucinda M. Finley, *Guarding the Gate to the Courthouse: How Trial Judges Are Using Their Evidentiary Screening Role to Remake Tort Causation Rules*, 49 DePaul L. Rev. 335, 341 (1999); *see also Goeb*, 615 N.W.2d at 812-14 (rejecting *Daubert* on grounds that, among other things, *Daubert* has not achieved its stated intention of relaxing the barriers to the admissibility of expert testimony); 2 Michael H. Graham, *Handbook of Federal Evidence* § 702.5, at 461-62 (5th ed. 2001) ("*Daubert* is a very incomplete case if not a very bad decision. It did not, in any way, accomplish what it was meant to, i.e., encourage more liberal admissibility of expert witness evidence. In fact, *Daubert* overall in practice actually created a more stringent test for expert evidence admissibility especially in civil cases."); David Crump, *The Trouble with* Daubert-Kumho*: Reconsidering the Supreme Court's Philosophy of Science*, 68 Mo. L. Rev. 1, 40 (2003) ("[A]s often happens, a premature pronouncement that was intended to be flexible has become an established set of criteria. It was foolhardy for the Court to ignore what was going to happen, which was that trial judges would consider the four *Daubert* factors to be legal principles established by the Supreme Court." (footnotes omitted)).

As a consequence of these stringent threshold standards for admitting expert testimony, we are concerned with the casedispositive nature of *Daubert* proceedings, whereby parties in civil actions may use pre-trial motions to exclude expert testimony under *Daubert* to bootstrap motions for summary judgment that otherwise would not likely succeed. As expressed in dicta by one federal trial court,

> This court notes that inherently, the judge's role in a *Daubert d*etermination [is] fraught with conflict. In most cases, if the court bars the testimony of one party's expert witness or witnesses, that party is unable to present an essential element of his or her claim, or to proffer a defense. Accordingly, judges are aware that applying *Daubert* heavy-handedly has the effect of lightening one's caseload, as a party stripped of its expert often must dismiss the claims or settle the lawsuit.

Brasher v. Sandoz Pharms. Corp., 160 F. Supp. 2d 1291, 1295 n.12 (N.D. Ala. 2001); *see also* Lloyd Dixon & Brian Gill, RAND Institute for Civil Justice, *Changes in the Standards for Admitting Expert Evidence in Federal Civil Cases Since the* Daubert *Decision* 62 (2001) ("Challenges to expert evidence increasingly resulted in summary judgment after *Daubert*.").

Procedurally, this imbalance may be explained because trial courts apply different evidentiary standards when ruling on motions to exclude expert testimony and motions for summary judgment. In a motion for summary judgment, the evidence presented to the trial court must be admissible at trial, N.C.G.S. § 1A-1, Rule 56(e) (2003), and must be viewed in a light most favorable to the non-moving party. *Caldwell v. Deese*, 288 N.C. 375, 378, 218 S.E.2d 379, 381 (1975). Where there are genuine, conflicting issues of material fact, the motion for summary judgment must be denied so that such disputes may be properly resolved by the jury as the trier of fact. *Kessing v.Nat'l Mortgage Corp.*, 278 N.C. 523, 534, 180 S.E.2d 823, 830 (1971) ("Since this rule provides a somewhat drastic remedy, it must be used with due regard to its purposes and a cautious observance of its requirements in order that no person shall be deprived of a trial on a genuine disputed factual issue.").

Not so in the case of preliminary motions to exclude expert testimony under *Daubert*, which are resolved under Rule of Evidence 104(a). Here, trial courts are not bound by the rules of evidence, are not required to view the evidence in a light favorable to the non-movant, and may preliminarily resolve conflicting issues of fact relevant to the *Daubert* admissibility ruling. N.C.G.S. § 8C-1, Rule 104(a). Taking advantage of these procedural differences, a party may use a *Daubert* hearing to exclude an opponent's expert testimony on an essential element of the cause of action. With no other means of proving that element of the claim, the non-moving party would inevitably perish in the ensuing motion for summary judgment. By contrast, a party who directly moves for summary judgment without a preliminary *Daubert* determination will not likely fare as well because of the inherent procedural safeguards favoring the non-moving party in motions for summary judgment.

In such instances, we are concerned that trial courts asserting sweeping pre-trial "gatekeeping" authority under *Daubert* may unnecessarily encroach upon the constitutionally mandated function of the jury to decide issues of fact and to assess the weight of the evidence. *See* N.C. Const. art I, § 25. *See also Brasher*, 160 F. Supp. 2d at 1295 (applying *Daubert*, but acknowledging that "[f]or the trial court to overreach in the gatekeeping function and determine whether the opinion evidence is correct or worthy of credence is to usurp the jury's right to decide the facts of the case"); *Logerquist v. McVey*, 196 Ariz. 470, 488, 1 P.3d 113, 131 (2000) ("The *Daubert*/*Joiner*/*Kumho* trilogy of cases . . . puts the judge in the position of passing on the weight or credibility of the expert's testimony, something we believe crosses the line between the legal task of ruling on the foundation and relevance of evidence and the jury's function of whom to believe and why, whose testimony to accept, and on what basis."); *Bunting v. Jamieson*, 984 P.2d 467, 472 (Wyo. 1999) (adopting *Daubert*, but nonetheless expressing concern that "application of the *Daubert* approach to exclude evidence has been criticized as a misappropriation of the jury's responsibilities.. . . '[I]t is imperative that the jury retain its fact-finding function.'" (citations omitted)).

Although our criticism of *Daubert* is largely anecdotal and by no means exhaustive, given the serious implications of these concerns, we believe that on balance the North Carolina law which has coalesced in *Goode* establishes a more workable framework for ruling on the admissibility of expert testimony under North Carolina Rule of Evidence 702. Long before

Daubert was decided, North Carolina had in place a flexible system of assessing the foundational reliability of expert testimony, the practicability of which is evidenced by the case law. Within this system, our trial courts are already vested with broad discretion to limit the admissibility of expert testimony as necessitated by the demands of each case. Requiring a more complicated and demanding rule of law is unnecessary to assist North Carolina trial courts in a procedure which we do not perceive as in need of repair. We therefore expressly reject the federal *Daubert* standard upon which both the trial court and the Court of Appeals erroneously based their respective rulings. North Carolina is not, nor has it ever been, a *Daubert* jurisdiction.

"When the order or judgment appealed from was entered under a misapprehension of the applicable law, the judgment, including the findings of fact and conclusions of law on which the judgment was based, will be vacated and the case remanded for further proceedings." *Concerned Citizens of Brunswick County Taxpayers Ass'n v. Holden Beach Enters.*, 329 N.C. 37, 54-55, 404 S.E.2d 677, 688 (1991). Accordingly, we hereby vacate the judgment of the trial court on this issue and reverse the opinion of the Court of Appeals affirming that judgment. The matter is remanded to the trial court for further proceedings not inconsistent with this opinion. . . .

In summary, for the reasons stated above, we hereby reverse the opinion of the Court of Appeals in its entirety and vacate the judgment of the trial court in its entirety. The case is remanded to the Court of Appeals with instructions to remand to the trial court for further proceedings not inconsistent with this Court's opinion.

REVERSED AND REMANDED.

Justice BRADY did not participate in the consideration or decision of this case.

Justice PARKER concurring in part and dissenting in part.

I concur in the majority's holding that this Court has not adopted the federal test for admissibility of expert testimony enunciated in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 125 L. Ed 2d 469 (1993), and in the decision not to adopt the *Daubert* factors as the test for determining admissibility of expert testimony under Rule 702 of the North Carolina Rules of Evidence but to continue to adhere to the test enunciated in our prior case law.

However, I am constrained to dissent respectfully from the holding of the majority reversing the opinion of the Court of Appeals and vacating the trial court's order allowing defendant's motion to exclude testimony of plaintiff's experts and the trial court's order allowing defendants' omnibus motion for summary judgment. In my view plaintiff's experts' testimony failed to satisfy the first prong of the three-part analysis set forth in the majority opinion based on this Court's decision in *State v. Goode*, 341 N.C. 513, 461 S.E.2d 631 (1995), namely, whether "the expert's proffered method of proof [is] sufficiently reliable as an area for expert testimony." As revealed in the careful analysis of the evidence in the trial court's findings, none of plaintiff's expert witnesses had done independent research or used established techniques to substantiate their respective proffered hypotheses as to (i) how the injury occurred, and (ii) whether the injury would have been prevented had plaintiff's helmet had a rigid mouth guard rather than a flexible one. *See State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852-53

(1990) (stating nonexclusive indices of reliability).

The trial court relied on both *Daubert* and *Pennington* in exercising its discretion to exclude the experts' testimony as to causation. Given this Court's jurisprudence governing the admissibility of expert testimony, the trial court's use of the *Daubert* factors does not in my opinion render the trial court's ruling fatally defective. *See Shore v. Brown*, 324 N.C. 427, 428, 378 S.E.2d 778, 779 (1989) (stating that "[i]f the correct result has been reached, the judgment will not be disturbed even though the trial court may not have assigned the correct reason for the judgment entered").

I would also vote to affirm the Court of Appeals' decision upholding the trial court's summary judgment for defendants on plaintiff's section 99B-6 and unfair and deceptive practices claims.