

Outlook • Perspective

Bad science puts innocent people in jail — and keeps them there

How discredited experts and fields of forensics keep sneaking into courtrooms.



By **Radley Balko** and **Tucker Carrington** March 21

About the authors

In 2009, a Mississippi jury convicted Christopher Brandon of killing his girlfriend’s 15-month-old son. Brandon claimed that the boy fell off a bed and struck his head on a toy, but the state’s expert witness, a [controversial medical examiner](#) named Steven Hayne, testified that the child had the symptoms of shaken baby syndrome (SBS).

At the time of Brandon’s trial, SBS was already highly contentious. It emerged as a popular diagnosis in the late ’90s and early 2000s, particularly after the high-profile conviction of British au pair Louise Woodward in 1997. Forensic pathologists and child advocates claimed that if a trio of specific symptoms were present in a deceased child — bleeding at the back of the eye, bleeding in the protective area of the brain, brain swelling — the child could have died only from violent shaking. But scientists [had begun expressing doubts](#), and studies [were showing](#) that the same symptoms can be caused by infections, genetic conditions and short falls.

Brandon’s attorney asked the court for funds to hire his own expert. The court refused, so the jury heard only from Hayne, the state’s expert, who testified that the child had died from shaking. He pointed to a textbook that, he said, debunked the criticism of SBS. The textbook actually said [the opposite](#). Hayne then cited a study that [doesn’t appear to exist](#). Brandon was sentenced to life in prison. When his attorneys filed an appeal questioning the SBS diagnosis and the syndrome itself and pointing out the discrepancies in the state’s case, the Mississippi attorney general said Hayne must have been referring to one of two conferences on SBS — both of which [took place after Brandon’s trial](#). (Disclosure: Tucker Carrington’s office represents Brandon.) A 2013 study by the Medill Justice Project at Northwestern University estimated that SBS played a role in about 3,000 convictions.

Since the onset in the 1990s of DNA testing — which, [unlike most fields of forensics](#), was born in the scientific community — we’ve learned that many forensic specialties aren’t nearly as accurate as their practitioners have claimed. Studies from the [National Academy of Sciences](#) and the [President’s Council of Advisors on Science and Technology](#) have concluded that there’s insufficient research to support the claims of the broad field of “pattern matching” forensics, which includes analyses of such things as hair fiber, bite marks, “tool marks” and tire tread.

These forensic specialties were never subjected to the rigors of scientific inquiry — double-blind testing, peer review — before they were accepted in courtrooms. Most are entirely [subjective](#): An analyst will look at two marks or patterns and determine whether they’re a “match.” Most of these disciplines can’t even calculate a margin of error.

The scientific process is slow and deliberate: A study is published. Other studies verify, contradict or refine its results. There’s no set point at which science declares a theory proven or disproven. It’s about the process itself and the gradual accumulation of knowledge.

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Courts work under a different set of rules. Statutes of limitations toll, procedural rules impose deadlines, and there's an emphasis on finality. With science, revision and correction are part of the process — it's okay to be wrong. The criminal justice system tends to operate as if its very legitimacy requires the certainty of a closed tomb.

At the trial level, juries hear far too much dubious science, whether it's an unproven field like bite mark matching or blood splatter analysis, exaggerated claims in a field like hair fiber analysis, or analysts testifying outside their area of expertise. It's difficult to say how many convictions have involved faulty or suspect forensics, but the FBI estimated in 2015 that its hair fiber analysts had testified in about 3,000 cases — and that's merely one subspecialty of forensics, and only at the federal level. Extrapolating from the database of DNA exonerations, the Innocence Project estimates that bad forensics contributes to [about 45 percent](#) of wrongful convictions.

But flawed evidence presented at trial is only part of the problem. Even once a field of forensics or a particular expert has been discredited, the courts have made it extremely difficult for those convicted by bad science to get a new trial.

The Supreme Court makes judges responsible for determining what is good science. They already decide what evidence is allowed at trial, so asking them to do the same for expert testimony may seem intuitive. But judges are trained to do legal analyses, not scientific ones. They generally deal with challenges to expert testimony by looking at what other judges have said. If a previous court has allowed a field of forensic evidence, subsequent courts will, too.

The [history of bite mark jurisprudence](#) shows how poorly the courts scrutinize expert testimony. The 1975 California case [People v. Marx](#) was the first time an appellate court allowed bite mark testimony. Three dentists claimed that they could match bite marks on the victim's nose to the teeth of the defendant. California followed a federal guideline that allowed the defendant to challenge the scientific validity of scientific testimony, but the appeals court ruled that bite mark matching was less science than a matter of common sense.

Three years later, another California appeals court cited *Marx* in upholding bite mark testimony once again, noting the “superior trustworthiness of the scientific bite mark approach.” But the *Marx* judges had explicitly noted that the analysis *wasn't* scientific. Nonetheless, other courts began citing the case. By 1987, 21 state appellate courts across the United States had accepted bite mark analysis, without a single dissenting opinion. By 2004, courts in 37 U.S. jurisdictions had accepted it.

In the 1990s, DNA testing began to show that bite mark analysis wasn't as reliable as its practitioners claimed. We now know that such analysis has led to more than two dozen wrongful arrests and convictions. And [a growing number of studies](#) have found no scientific evidence to support its two core assumptions — that teeth are as unique as fingerprints and that human skin can record this uniqueness with enough detail to identify someone.

Yet, to date, every time a defendant has challenged the scientific validity of bite mark analysis, the court has upheld it, including [a Pennsylvania court last year](#). Judges point out that lots of other courts across the country have ruled that bite mark evidence is legitimate. In fact, in at least three states, the controlling case law on such evidence is a case in which the defendant was later exonerated. In Wisconsin, the [controlling precedent](#) is a 1986 ruling in which the judges went on for paragraphs about the impeccable scientific credentials of the bite mark witnesses. The court declared that the analysts had been so utterly convincing as “to exclude to a moral certainty every reasonable hypothesis of innocence.” That conviction was overturned based on DNA evidence in 2009, after the defendant spent 23 years in prison.

Courts have been more amenable to SBS defendants. The [National Registry of Exonerations](#) lists 16 SBS convictions that have been overturned. But so far, there has been no systematic effort to review old convictions. (In August 2014, the Mississippi Supreme Court granted Brandon an evidentiary hearing, which has yet to take place.)

 **259 Comments**

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