

The Washington Post (Feb 2015)

Part 1

<http://www.washingtonpost.com/news/the-watch/wp/2015/02/13/how-the-flawed-science-of-bite-mark-analysis-has-sent-innocent-people-to-jail/>

Part 2

<http://www.washingtonpost.com/news/the-watch/wp/2015/02/17/it-literally-started-with-a-witch-hunt-a-history-of-bite-mark-evidence/>

Part 3

<http://www.washingtonpost.com/news/the-watch/wp/2015/02/18/attack-of-the-bite-mark-matchers-2/>

Part 4

<http://www.washingtonpost.com/news/the-watch/wp/2015/02/20/the-path-forward-on-bite-mark-matching-and-the-rearview-mirror/>

General Comment and follow up (By [Radley Balko](#) April 8 2015)

<http://www.washingtonpost.com/news/the-watch/wp/2015/04/08/a-bite-mark-matching-advocacy-group-just-conducted-a-study-that-discredits-bite-mark-evidence/>

Full Text

Part 1 (Feb 13th 2015)

How the flawed 'science' of bite mark analysis has sent innocent people to prison

This is part one in a four-part series. The rest of the series will be posted next week.

Before he left the courtroom, Gerard Richardson made his mother a promise. “I told her that one day she’d see me walk out of that building a free man,” he says.

Her response nearly broke him. “She said, ‘Gerard, I’ll be dead by then.’”

Richardson, then 30, had just been convicted for the murder of 19-year-old Monica Reyes, whose half-naked body was found in a roadside ditch in Bernards Township, N.J. The year was 1995, and Richardson had just been sentenced to 30 years in prison.

There were only two pieces of evidence implicating him. One was a statement from Reyes’s boyfriend, who claimed to have heard Richardson threaten to kill her. But that statement was made only after police had shown the boyfriend the second piece of evidence: a finding from a forensic odontologist that a bite mark found on Reyes’s body was a match to Richardson’s teeth. Dr. Ira Titunik, the bite mark expert for the prosecution, would later tell jurors there was “no question in my mind” that Richardson had bitten Reyes.

“I thought it was crazy,” Richardson says. “There was no way it was possible. The FBI looked at hairs, fibers, blood, everything the police found at the crime scene. None of it came from me. Just this bite mark.”

Despite his certainty, Titunik’s analysis consisted of little more than a one-page report identifying Richardson as the culprit. “There were only two things on that sheet. It said there was a bite mark on the victim, and that I had made it.”

In fact, when questioned at trial about his methodology — about why he was able to single out Richardson as the biter — Titunik relied on a more detailed report offered by Richardson’s own expert witness, Norman Sperber, also a bite mark analyst. But Sperber, also going off his own report, told jurors there was no way the bite mark could have been left by Gerard Richardson. Two witnesses who called themselves experts relied on the same report and came to diametrically opposing conclusions.

“I thought that was the very definition of reasonable doubt,” Richardson says. “The only physical evidence against me was Dr. Titunik’s testimony. But my own expert

was just as qualified as he was and was saying the very opposite. And they were both using the same report. How could that not be reasonable doubt?”

In 1998, three years after Richardson’s conviction, a handyman named Edmund Burke was arrested for the brutal murder of a 75-year-old woman near her home in Massachusetts. Burke became a suspect after a police dog led officers to the house where Burke lived with his mother, about a quarter-mile from the crime scene. As with Richardson, the only physical evidence against Burke was the testimony of a bite mark expert who claimed to match Burke’s teeth to marks found on the victim. That expert, Dr. Lowell Levine, hadn’t actually examined the body, only photos of it. Nevertheless, he claimed he could match a dental mold of Burke’s teeth to the bite marks in the photos with “a reasonable degree of scientific certainty.” Prosecutors then turned to a second odontologist to verify Levine’s match: Ira Titunik. He did.

Burke was held in jail for 41 days. He was released when DNA testing on saliva recovered from the bite mark excluded him. Five years later, DNA from the saliva around bite mark hit a match in the FBI’s Combined Index DNA System (CODIS). The match was to a man already convicted of murder. Prosecutor William Keating, who took office after Burke’s arrest, [told the Chicago Tribune](#) he had “no question” that Burke was innocent.

Gerard Richardson wasn’t quite as lucky as Edmund Burke. Though saliva was also collected from the bite mark left on Monica Reyes, the DNA technology available at the time wasn’t able to produce a profile. It would take nearly two decades for the technology to improve to the point where enough useful DNA could be extracted from the small amount of saliva. When that finally happened, it showed that Richardson wasn’t Reyes’s killer.



Gerard Richardson (Photo by Radley Balko)

Richardson was finally released in December 2013. He says that when his attorneys told him he could be released, he was elated and relieved. But he also didn't want his vindication to be validated in a stack of papers.

“I wanted it done in a courtroom,” he says. “I wanted to hear it from a judge. I wanted my family and friends to hear a judge declare my innocence.” Most important, he says, he wanted to keep his promise to his mother. “She saw me walk out of the courtroom. A free man.”

The field of forensics has reached an important moment. In 2009, the National Academy of Sciences [published a congressionally commissioned report](#) on the state of forensic science in the courtroom. The report was highly critical of a wide range of forensic specialties, from fingerprints to hair and fiber analysis to blood spatter analysis. It found that many of the claims forensic analysts have been making in courtrooms for decades lacked any scientific foundation to back them up. Yet judges and juries have taken and continue to take those claims as foolproof science, often because the experts themselves frame them that way.

The report was particularly critical of an area of forensics loosely known as pattern matching. That area encompasses a group of largely subjective specialties in which an analyst looks at two pieces of evidence, such as carpet fibers, hair fibers or marks made by tools, and simply declares based on his or her experience and expertise whether the two are a match.

Bite mark analysis is also part of this group. But even within the pattern matching disciplines, the NAS report singled out bite mark matching for some especially harsh criticism. The report found “no evidence of an existing scientific basis for identifying an individual to the exclusion of all others.” The problem is that this is precisely what bite mark analysts do — and what they have been doing for decades.

Bite mark matching has been around since the 1970s. Generally speaking, bite mark analysts look at indentations found in human skin thought to be caused by human teeth. They first confirm the marks are actually a human bite. They then compare

those marks to plaster molds taken of the teeth of one or more suspects. In some cases, analysts will make a mold of the bite itself. In others, they'll perform their analysis from a photograph of the bite, sometimes with the aid of software like Adobe Photoshop.

But this is just a generalization of the practice. It's difficult to lay out the standard procedure of a bite mark analysis because it varies from analyst to analyst. Professional organizations claim to have established best practices and procedures, but there is little to no self-policing within the field. The discipline has been evolving on the fly, not usually in response to scientific research but ahead of it, often as a defensive move after the exonerations of people convicted by the testimony of its practitioners.

Bite mark analysis is most commonly used in criminal rape, murder and child abuse cases. It also sometimes comes into play in child custody disputes. The field has always had its critics. As with other flawed forensic specialties, those critics found some vindication in the 1990s when DNA testing started uncovering wrongful convictions won primarily on bite mark testimony. According to the Innocence Project, [24 people](#) — including Gerard Richardson — have been exonerated after they were either convicted or arrested because of the assertions of a bite mark analyst. (A 25th, Douglas Prade, was initially cleared in Ohio, but that decision [was overturned by an appeals court](#) last March.) Chris Fabricant, a director of special litigation for the Innocence Project who specializes in bite mark evidence, estimates that there are still hundreds of people in prison today due to bite mark testimony, including at least 15 awaiting execution.

The NAS report generated a lot of media coverage. It spawned congressional hearings, think pieces, and legal conferences. It also spurred the White House to turn to the classic Washington response to a pressing problem: the blue ribbon panel. [The National Commission on Forensic Science](#) has been given the mission to “enhance the practice and improve the reliability of forensic science” and to “promote scientific validity” in the courtroom. The NAS report also elicited promises from large forensic professional organizations to establish best practices, take ethics more seriously and do a better job of policing their members.

There is no better example of the pitfalls of allowing junk science into the criminal justice system than bite mark analysis: The field has helped convict a disturbingly high number of people later proven to be innocent. The National Academy of Sciences found it to be lacking of any basis in science. And its members have a poor track record of policing themselves. Yet this particular forensic discipline is not only still going strong; it may be as strong as ever.

The community of bite mark analysts wields considerable influence. The field's foremost advocacy group and certifying organization, the [American Board of Forensic Odontology](#) (ABFO), is aggressive, dogged and holds a lot of sway within the [American Academy of Forensic Sciences](#) (AAFS), one of America's largest professional forensics organizations. And while bite mark matching and the ABFO may be looked upon with some suspicion by other forensic specialists (and certainly by the scientific community), the AAFS is generally seen as an innocuous, credible umbrella organization. As one advocate for forensic reform put it in an interview for this series, "The ABFO needs AAFS for legitimacy. The AAFS doesn't really need the ABFO."

(Not all forensic dentistry is this controversial. The ABFO also represents practitioners who use dental records to identify human remains, a field that is well established and well regarded by both the scientific and forensic communities.)

The AAFS and its leadership have been active in the forensics reform movement that has arisen in the wake of the NAS report. The problem is that the AAFS has also been aiding bite mark analysts and their supporters, lending some of its legitimacy to the cause. That's in part because the ABFO has been persistent and successful in promoting its own membership for leadership positions within AAFS. Four bite mark analysts have served as president of the AAFS, most recently in 2012. And so even as the influential AAFS and its leadership pay lip service to forensics reform and the problems addressed in the NAS report, the group is actively working to push bite mark analysis, for which — again — the NAS report reserved some of its harshest criticism. This narrative was confirmed by several prominent advocates for forensics reform, though it's worth noting that most of these outspoken advocates

were unwilling to criticize the AAFS for attribution. The organization is still that influential.

Much of the NAS report's bite mark section was based on the research of Michael Bowers, a 65-year-old dentist, college professor and deputy medical examiner in Ventura County, Calif. Bowers has seen lots of cases like Richardson's. He has personally assisted in seven exonerations of people convicted because of bite mark evidence. For about a quarter-century, Bowers has been basically trying to eradicate bite mark matching from the courtroom.

"I've watched over and over as these people take the witness stand and give testimony that isn't just false and misleading, but that has put innocent people in prison," Bowers says. "It's such a corruption of justice. But for a long time people just didn't want to hear about it."

Bowers fought his battle from within as a member of the ABFO, where he once served on committees and held leadership positions. When that didn't work, he resigned from the organization and began criticizing it from the outside. That's when he became a target.

Two months after Gerard Richardson was released from prison, Peter Loomis, then president of the ABFO, filed an ethics complaint with the AAFS. It was the first time the president of the ABFO had ever filed such a complaint. But Loomis's complaint wasn't against Ira Titunik, the man whose testimony sealed Richardson's conviction. Nor was it against any of the bite mark analysts who have contributed to other false arrests or convictions over the years.

Instead, Loomis's complaint was against Michael Bowers. If successful, the complaint could get Bowers expelled from the AAFS and effectively destroy his credibility as an expert witness. It would remove an important critic from the courtroom. (I'll have more on the specifics of the complaint in Part 3.) **UPDATE (Monday): At its annual meeting, the AAFS's board dismissed the complaint against Bowers.**

The 2009 NAS report also expressed the need for more scientific research on the underlying assumptions of bite mark analysis — that human dentition is unique and that human skin is capable of registering bite marks in a way that makes them identifiable and distinguishable. Just as the NAS report was being published, a research team at the University of Buffalo led by the husband-and-wife team of Peter and Mary Bush [was preparing to publish](#) the results of a series of studies they had designed to probe exactly those questions. The results so far have been damning for the field of bite mark analysis. Bite mark analysts and their supporters have since subjected the Bushes to vicious, sometimes highly personal attacks.

This past fall the Justice Department announced the members of the National Forensic Science Commission subcommittee that [will study the scientific validity of bite mark matching](#). This is part of the reform process put in motion by the NAS report. Incredibly, a majority of the members of the subcommittee are people who either practice or have openly defended the very sort of bite mark matching that the NAS report criticized. Robert Barsley, the chairman of the committee, is not only a practicing bite mark analyst, but his testimony also [helped put an innocent man in prison for 17 years](#).

Meanwhile, every time someone has challenged the science of bite mark matching in court since 2009, the court has ruled the other way. In short, the scientific community has declared that bite mark matching isn't reliable and has no scientific foundation for its underlying premises, and that until and unless further testing indicates otherwise, it shouldn't be used in the courtroom. And so far, the criminal justice system has said it doesn't care. If bite mark matching is a bellwether issue for meaningful forensics reform, the prospects for meaningful reform appear to be dim.



[Radley Balko blogs about criminal justice, the drug war and civil liberties for The Washington Post. He is the author of the book "Rise of the Warrior Cop: The Militarization of America's Police Forces."](#)

Part 2 (Feb 17th 2015)

It literally started with a witch hunt: A history of bite mark evidence

This is part two in a four-part series. Read part one [here](#).

On May 4, 1692, the Rev. George Burroughs was arrested in Salem, Massachusetts on suspicion of witchcraft. The only physical evidence against Burroughs were bite marks found on some of the girls he was accused of recruiting to join him.

Summarizing the research of historians on the ordeal [in an article](#) for the February 2014 newsletter of the New York State Dental Association, William James Maloney writes that at trial, “the defendant’s mouth was pried open and the prosecution compared his teeth with the teeth marks left on the bodies of several injured girls present in the courtroom.”

At the urging of notorious witch hunter Cotton Mather, Burroughs was convicted, sentenced to death and hanged. Two months later, the governor of Massachusetts called for an end to the witchcraft trials. He also prohibited the use of “spectral and intangible evidence” in criminal trials. Two decades later, Burroughs was declared innocent, and the colony of Massachusetts compensated his children for their father’s wrongful execution.

Nearly three hundred years later, in 1974, Walter Edgar Marx was convicted of voluntary manslaughter due in part to bite marks found on the nose of his alleged victim. The marks were found during an exhumation of the victim’s body more than six weeks after she had been autopsied, embalmed and buried. Three dentists testified for the state that they could match an impression made of the marks to Marx’s teeth. In 1975, a California appeals court [upheld the conviction](#). That ruling has become enormously influential. In a 2000 article for the [Albany Law Review](#), Seton Hall law professor and evidence expert Michael Risinger wrote that the *Marx* ruling “came to be read as a global warrant” for courts to admit bite mark evidence.

The *Marx* case effectively went around the prevailing standard for admitting forensic evidence: the 1923 case [Frye v. United States](#), in which the U.S. Court of Appeals for the D.C. Circuit rejected testimony from a polygraph instructor who claimed that a

rise in systolic blood pressure indicated that a suspect was lying. The appeals court ruled that in order to be admissible in federal court, scientific evidence or testimony must have “gained general acceptance in the particular field in which it belongs.” For the next 70 years, *Frye* was the model in federal court, and was subsequently adopted by nearly every state in the country. (The Supreme Court didn’t address the standard until 1993, with three rulings now known as [the Daubert cases](#). The *Daubert* standard instructs judges to assess both the relevance of expert testimony and whether the testimony itself is reliable.)

In *Marx*, the judges actually accepted that there was no scientific research to support bite mark matching. There is “no established science of identifying persons from bite marks” and “no evidence of systemic, orderly experimentation in the area,” the court wrote. But the judges’ reasoning then took a peculiar turn. Because there was no science to analyze, the court declined to hold a *Frye* hearing. Instead, the judges simply invented their own test for evidence that wasn’t scientific, but was nevertheless presented with a science-like veneer. They found that because the trial judge saw the bite mark evidence and concurred that it seemed sound, that was good enough for them. (Marx was convicted at a bench trial, not a jury trial.) The appeals court judges wrote that the evidence was admissible because to not admit it would be to “abandon common sense.”

Three years later, another California appeals court relied on *Marx* [to uphold bite mark evidence again](#). Bizarrely, that court explicitly referenced the “superior trustworthiness of the scientific bitemark approach,” despite the fact that the *Marx* opinion specifically acknowledged a *lack* of scientific research in support of the practice. From there, bite mark evidence began to get accepted simply by virtue of the fact that it had been accepted in other courts in previous cases. Thus began an established record of precedents. It also began an established record of wrongful convictions.

Bite mark matching then gained national notoriety in 1979 during the trial of serial killer Ted Bundy. The high profile nature of the case, the brutality of the crime and Bundy’s obvious guilt cast a public image of bite mark analysis as an emerging science that could put away serial killers and sex offenders, and the analysts

themselves as heroic scientists who help put dangerous people behind bars. One of the analysts who testified in Bundy's case was Lowell Levine. Bundy's conviction launched Levine's career. He became one of the most visible bite mark evangelists in the United States. In 1977, [he wrote](#) that a bite mark match "is as good as a fingerprint." It was 20 years later that Levine's analysis would lead to the wrongful arrest of Edmund Burke discussed in part one of this series.

Levine later served terms as president of both the American Board of Forensic Odontology (ABFO) and the American Academy of Forensic Sciences (AAFS), and became one of just a few dentists to make a full-time career of bite mark analysis. [In a 2011 interview](#) with CNN's Anderson Cooper, Levine continued to defend bite mark analysis as "important and viable." But when Cooper asked if there's any way bite mark analysis can be reconciled with the scientific method, Levine replied with some candor: "I sure can't think of it." Yet Levine has testified countless times in court about his "level of scientific certainty" with respect to bite marks.

In a forthcoming law review article, [Chris Fabricant](#) of the Innocence Project and [Tucker Carrington](#) of the Mississippi Innocence Project look at how the *Marx* ruling affected bite mark admissibility. They found 16 court opinions from 12 states over the following 13 years after *Marx* that either relied on the decision, or adopted what Fabricant and Carrington call "the eyeball test." All but three of those rulings noted the "scientific" nature of bite mark analysis, despite the fact that, again, not only is there no science to back up the claims of bite mark analysts, but the *Marx* decision explicitly acknowledges as much. [One such ruling](#) came in 1978 after the Arizona Supreme Court heard arguments to overturn a conviction based on bite mark testimony from Homer Richardson Campbell Jr., a ABFO-certified forensic odontologist. Campbell told the jury that the odds of anyone other than the defendant leaving the marks he found on the victim's breast were "eight on one million." On cross examination, Campbell conceded that he didn't compute those odds personally. Rather, they were a rough estimate of his memory of "articles written in the journals of the American Academy of Forensic Sciences." In truth, there was no scientific basis for his estimation whatsoever. The court nevertheless found his testimony admissible, and upheld the conviction.

In 1987, Campbell's testimony helped convict Joe Sidney Williams of a rape and murder in Texas. [Williams was exonerated by DNA testing in 2001](#). Campbell's bite mark matching also helped convict David Wayne Spence for the 1984 murders of three teenagers near Lake Waco, Tex. In fact, his testimony was the only evidence linking Spence to the scene of the crime. During Spence's appeal, his attorneys showed the crime scene photos Campbell used to make his match to five other ABFO-certified forensic odontologists, along with dental molds from five people, including Spence. Only two matched the photographed bite marks to any of the dental molds, and both matched them to the mold of an uninvolved patient of the dentist who ran the test. The lead homicide investigator in the case [told New York Times columnist Bob Herbert in 1997](#), "My opinion is that David Spence was innocent. Nothing from the investigation ever led us to any evidence that he was involved." Spence was executed by the state of Texas in 1997.

Campbell, now deceased, would go on to become a prominent advocate for bite mark matching. He also served as president of the American Academy of Forensic Sciences.

One particularly striking example of how bite mark matching was back-ended into the criminal justice system came in [a 1986 ruling by the Court of Appeals of Wisconsin](#). The case was the first time bite mark evidence had been introduced in the state. The court's ruling was one of "first impression," meaning that there was no precedent, and that its ruling in the case would likely establish one. In 1983, Robert Lee Stinson had been convicted of raping and murdering an elderly woman. The only physical evidence linking him to the crime was the testimony of two bite mark specialists: Lowell Thomas Johnson and Raymond Rawson.

Rawson at the time was on the ABFO's Bite Mark Standards Committee. He had also co-authored the organization's original guidelines for bite mark matching. Johnson performed the initial analysis in the Stinson case by placing a mold of the suspect's teeth over photographs taken of some marks on the victim's body. Johnson concluded that the marks "had to have been made by teeth identical in all of these characteristics" to the teeth of Robert Lee Stinson. Rawson went next, and confirmed

that the marks matched Stinson's teeth "to a reasonable degree of scientific certainty."

Stinson appealed the admission of bite mark evidence in his trial. The Wisconsin Court of Appeals ruled against him. The court's opinion was forceful and authoritative.

A total of fourteen upper and lower jaw impressions were made from the bite marks found on Cychosz's body. Because of the opportunity to examine so many bites, and the fact that some of the bites were so deep as to be three-dimensional, Dr. Johnson testified he was able to detect a repetition of some particularly unique features in several of the bites.

Dr. Johnson later performed a forensic odontological examination of Stinson. Following the examination, Dr. Johnson noted the following unique features: one of the central incisors was fractured and decayed almost to the gum line; the lateral incisor in the upper jaw was set back from the other teeth; all of the upper front teeth were flared; the lower right lateral incisor was worn to a pointed edge; the right incisor was set out from the other teeth on the lower jaw. Dr. Johnson used these features along with the arch of the mouth and the spacing, width, and alignment of the teeth to make comparisons with the bite marks found on the victim. After an exhaustive examination of the photos, models and tissue samples taken from Stinson and the victim, Dr. Johnson concluded, to a reasonable degree of scientific certainty, that the bite marks on the victim were made by Stinson.

The jury also heard from Dr. Rawson who concluded, based on the workup Dr. Johnson performed on both the victim and Stinson, that Stinson had inflicted the bite marks on the victim. In Dr. Rawson's opinion the evidence in the case was overwhelming and he stated that "if we have four or five teeth that we are able to examine, then we can say that there is no other set of dentition like that." In this case, Dr. Johnson was able to identify seventy-five individual tooth marks in various combinations of between five and eleven teeth.

In the end, the Wisconsin Court of Appeals concluded that the reliability of the bite mark evidence in the case was sufficient “to exclude to a moral certainty every reasonable hypothesis of innocence.”

And yet the court was wrong. Stinson spent 23 years in prison before DNA testing exonerated him. Stinson never bit the victim. All of the argumentation about set-back incisors, flared teeth and the arch of the mouth, all of that evidence that screamed guilt — *to a moral certainty* no less — it was all nonsense. Yet the court never made any effort to correct its mistake. As Fabricant and Carrington point out in their article, *State v. Stinson* is still the controlling precedent for bite mark evidence in Wisconsin. That the man whose name appears in the case was actually innocent doesn't seem to matter.

Six years later, after the ruling in the *Stinson* case, Raymond Rawson helped convict another innocent man. In 1992, Ray Krone was convicted of murdering Phoenix waitress Kim Ancona. The only physical evidence linking Krone to the crime scene were bite marks left on the victim that two forensic odontologists, one of them Rawson, said could only have been inflicted by Krone. The highly-publicized trial and the nature of the bite mark testimony earned Krone the nickname, “[the Snaggletooth Killer](#).”

In 1995, Krone was awarded a new trial due to a legal technicality. The following year he was convicted a second time, again due to testimony from Rawson, who declared a pattern on the victim's bra to be a “scientific match” to Krone's teeth. Krone spent 10 years in prison, including some time on death row, before he was exonerated by DNA evidence in 2002.

By 1988, the West Virginia Supreme Court [noted in an opinion](#) that bite mark matching had been so “generally accepted” in American courtrooms that a *Frye* analysis was no longer necessary. (In that particular case, a bite mark analyst had determine that a tooth mark in a roll of paper towels was a “perfect match” to the defendant “to the exclusion of all other individuals.”) By the time that ruling came down, 21 state appellate courts had accepted bite mark analysis, without a single dissenting opinion. There still wasn't a shred of scientific evidence to back any of it up. Instead, all of these courts had relied on the rulings of prior courts, going all the

way back to *Marx*. In some instances, these state courts adopted what Fabricant and Carrington call the *Marx* court's "eyeball test." In others, the state courts falsely claimed that *Marx* had already validated the science of bite mark matching, or they cited opinions that had falsely stated the same, thus relieving them of the need to do an analysis themselves — a phenomenon Fabricant and Carrington call the "echo chamber effect."

"Most of the time when doing one of these analyses, the only thing a judge will ask is, 'Have other courts allowed this?'" says [Michael Saks](#), a law professor at Arizona State University who has written extensively on the intersection of law and science. "If the answer is yes, then they'll figure out a way to let it in. Or they'll decide that if the government is paying a person to do this analysis, it must be legitimate. That's a far cry from an analysis of its scientific merit. But it doesn't seem to matter."

More state courts followed West Virginia's lead, accepting bite mark matching based solely on the fact that other courts had already accepted it.

By the early 1990s, the bite mark matching business was booming. One of the most prolific expert witnesses of that era was a Hattiesburg, Miss., dentist named [Michael West](#). Using yellow goggles and ultraviolet light, West claimed to have pioneered a new method of bite mark analysis that allowed him to find and analyze bites that no one else could see, not even other trained forensic odontologists. Conveniently, West said that his process couldn't be duplicated or recorded. He called it "[the West Phenomenon](#)."

West struck the right balance of brash arrogance and aw-shucks charm to win the trust of Mississippi jurors. That made him hugely popular with prosecutors. His services were in ever-increasing demand, particularly in Mississippi and Louisiana, even as his claims grew more preposterous.

In one case, West claimed to have matched the bite marks in a [half-eaten bologna sandwich to the defendant](#). The jury convicted. (The conviction was overturned on appeal when defense lawyers discovered that the autopsy report recorded a partial bologna sandwich in the stomach of the victim.) In 1991, West claimed to have found bite marks in an exhumed body that had been buried months earlier, even though

police and investigators never noticed the marks when the body was fresh. He then said he could match the bite marks to the woman's husband, [Anthony Keko](#). West and (the [also controversial](#)) Mississippi medical examiner Steven Hayne didn't photograph or preserve the incriminating marks. They claimed to have tried to preserve one of them, but say they inadvertently destroyed the sample by storing it in the wrong type of solution. So West was testifying from memory. The jury still convicted.

Despite these incidents, by 1994 West had testified in several states, was testifying frequently in Mississippi and had been [elected coroner of Forest County, Miss.](#) In 1996, [West told the American Bar Association Journal](#) that he had testified in 55 cases. He had also recently been certified by an Ohio court as an expert in "splash patterns." That ABA Journal profile was critical, and noted the mounting skepticism in the legal community about West's claimed expertise.

Yet judges continued to certify West, and prosecutors continued to utilize him. One Louisiana prosecutor told the publication, "I'm quite confident in the guy . . . I think he makes one heck of a witness."

In September 1990, 3-year-old [Courtney Smith was abducted](#) from her bedroom in Noxubee County, Miss. She was then raped and murdered. Michael West was called in to perform a bite mark analysis, and he claimed to match marks he found on the child's body to Levon Brooks, the boyfriend of the girl's mother. In January 1992, Brooks was convicted of murder and sentenced to life in prison.

Four months later, in May of 1992, 3-year-old [Christine Jackson was abducted](#) from her room, raped, and murdered. Jackson lived just a few miles from where Smith had been murdered. Local law enforcement officials again focused their investigation on the boyfriend of the victim's mother, in this case Kennedy Brewer. West again claimed to have found bite marks on the victim, and again claimed he could match the marks to the prosecution's main suspect, to the exclusion of anyone else. Brewer was convicted in 1995 and sentenced to death.

Today, the ABFO disclaims Michael West, calling him a rogue whose methods were never embraced by mainstream analysts. "Things have changed since the 1990s,"

says Peter Loomis, the ABFO president. “This is an evolving field. We want to do the right thing.”

It’s true that in 1995, the ABFO gave West a one-year suspension. To date, [it is the only time the ABFO has ever disciplined one of its members](#). (West protested by resigning from the organization.) But though that suspension was in effect during Kennedy Brewer’s trial, it still didn’t prevent West from testifying. And up until that point, West was an ABFO-certified forensic odontologist, despite the fact that he was already regularly giving testimony well outside the constraints of reality.

By the time the Brewer case made its way to the Mississippi Supreme Court in 1998, the problems with West were well-known. Yet the court [still upheld his testimony](#), explicitly writing that West “clearly” had the “knowledge, skill, experience, training, and education necessary” to testify as an expert witness. The next year, [the same court also upheld the conviction of Levon Brooks](#). This time, the court explicitly took judicial notice of bite mark analysis, writing, “We now take the opportunity to state affirmatively that bite mark identification evidence is admissible in Mississippi.” Just one justice dissented. Among the authorities the court cited in that opinion: the Wisconsin Supreme Court’s *Stinson* decision.

Also in 1992, [West’s testimony helped convict Eddie Lee Howard](#) of killing 84-year-old Georgia Kemp. In his closing argument, Mississippi District Attorney Forrest Allgood made reference to the growing criticism of West, but he told the jurors that this was merely a testament to West’s brilliance. West, Allgood said, was a great mind of science who was merely ahead of his time. “Whether we like to think so or not, the progress of mankind has been carried forward on the backs of people like Michael West,” Allgood said. “The church threatened to burn Copernicus because he dared to say that the planets didn’t revolve around the earth. So it was with Michael West.” (Allgood also seems to have mistaken Copernicus for Galileo.) The jury convicted Eddie Lee Howard, and sentenced him to death.

In 2001, West was further exposed, this time by Christopher Plourd, the attorney for Ray Krone, the Arizona man convicted by Ray Rawson. Angered by what had happened to his client, Plourd set out to demonstrate the illegitimacy of bite mark analysis. Plourd had a private investigator send West photos of the bite marks on the

woman Krone was wrongly convicted of killing. The investigator also sent West a dental mold of his own teeth, a retainer check and a made-up cover story. He asked West if he could match the crime scene photos to the dental mold he had enclosed. West not only confirmed the match, [he sent back a 20-minute video](#) in which he confidently explained why only the person whose teeth were represented in the dental mold could have left the marks on the victim. That of course was impossible.

Five years later, the Mississippi Supreme Court heard the appeal of [Eddie Lee Howard](#). The court was now aware of all of West's exploits, including Plourd's "proficiency test." Incredibly, the court [still upheld West's testimony](#), explaining that "just because Dr. West has been wrong a lot, does not mean, without something more, that he was wrong here."

Since then, videos have emerged of some of West's bite mark examinations. In them, he is shown [repeatedly jamming](#) suspects' dental molds [into the skin of the alleged victims](#). Forensics specialists have said that at minimum, the videos depict gross malpractice and reveal West to be tampering with evidence. But some experts, like Michael Bowers ([see part one for more on him](#)), say the videos show West actually creating the bite marks he would later claim in testimony were inflicted by the suspect.

In 2007, two years after that Mississippi Supreme Court's ruling in the Howard case, Kennedy Brewer and Levon Brooks were exonerated. DNA taken from the young girls' bodies in both cases were finally run through the state database. The DNA profile from both cases was the same; it matched [Justin Albert Johnson](#), a man who lived near the scene of both crimes. He later confessed.

Johnson was initially a suspect in the first murder before West matched the bite marks to Levon Brooks. Not only did West's bite mark matching wrongly imprison two innocent men for 15-plus years, he may well have allowed Johnson to remain free to rape and murder Christine Jackson.

Recently, even West himself said [he no longer believes](#) in the validity of bite mark matching. (Though in typically odd fashion, he still defended his own bite mark testimony.) But that doesn't mean the state's courts and prosecutors are overturning

convictions that West was a part of. In the summer of 2011, [Mississippi Attorney General Jim Hood claimed he had opened an investigation](#) into West. Months later the assistant district attorney in charge of that investigation said it had consisted of no more than a “Westlaw search” of relevant cases — the legal equivalent of a Google search. Three-and-a-half years later, nothing else has come of that investigation. Instead, Hood and his subordinates continue to argue that the defendants still in prison due to West have already used up their opportunities to challenge his credibility. That is, they either tried to challenge West or bite mark evidence in general and lost, or they never tried to challenge, and now it’s too late.

Just last month, Hood’s office filed another brief in the Eddie Lee Howard case which astonishingly cites the Mississippi Supreme Court’s rulings in the *Brooks* and *Brewer* decisions. The brief points out that the state’s supreme court has “unequivocally held on direct appeal that Dr. West was qualified to testify as an expert in forensic odontology,” and that “bite-mark evidence is admissible in Mississippi.” Legally speaking, Hood’s office is correct. *Brewer* and *Brooks* may have been innocent, but they weren’t exonerated by a precedent-setting court opinion. So just as *Stinson* is still the law in Wisconsin, the Mississippi Supreme Court’s rulings in *Brewer* and *Brooks* are still good law in Mississippi — and the state’s controlling law on bite mark evidence.

If he wanted, Hood could release Howard tomorrow, or even agree to a new trial without using West’s testimony. Instead, Hood’s office is essentially arguing that the people convicted based on the testimony of a man Hood himself has said is untrustworthy should be kept in prison on a technicality. Or possibly even executed. Currently, two men are still on death row due primarily due to bite mark analysis performed by Michael West — Howard in Mississippi, and [Jimmie Duncan in Louisiana](#).

Though bite mark analysts like West and Rawson are now either disclaimed or quietly ignored by the ABFO and the community of bite mark analysts, their impact on the field is hard to overstate. Rawson, as noted, was a former president of ABFO who helped write the first guidelines for bite mark analysis. And both West

and Rawson were as prolific at authoring articles on their methods for forensic journals and odontology textbooks as they were at testifying in court.

The ABFO may now try to distance today's bite mark analysts from men like Rawson, Campbell and West, but those figures wielded enormous influence in the field during the era when the courts were issuing precedent-setting opinions about admissibility. (Rawson is still a member in good standing.) And that influence persists. As noted earlier, West is still considered a reliable expert by the Mississippi Supreme Court and the office of Mississippi Attorney General Jim Hood. And it isn't just in Mississippi. In 1994, John Kunco was convicted of rape due to bite mark analysis that was based on the methods first pioneered by West. That conviction [was upheld by a Pennsylvania judge in 2011](#).

More to the point, the ABFO still embraces members who have participated in more recent wrongful arrests or convictions. Some of them hold or have held leadership positions within the organization. The ABFO has never sought to discipline or file ethics complaints against those members. Instead, as this series will explore tomorrow, the group's leadership has focused on ruining the people who have helped expose those wrongful arrests and convictions. Bite mark matching in America began with a literal witch hunt. Its proponents are engaged in a figurative one today.

Part 3 (Feb 18th 2015)

Attack of the bite mark matchers

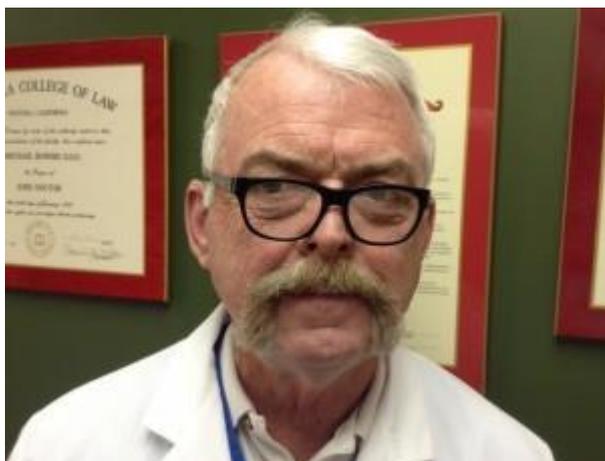
This is part three in a four-part series. Read part one [here](#) and part two [here](#).

There were red flags that bite mark analysis was flawed even as the first cases in the 1970s secured its use in the courtroom. For example, [a 1975 study](#) asked bite mark analysts to match bite marks made in pig skins under optimal laboratory conditions to the teeth that were used to make the marks. The error rate was 24 percent. When the analysts were asked to make their matches from photos of the marks taken 24 hours later — as is often done in criminal cases — they were wrong nine out of 10 times.

But neither proficiency test results nor a lack of scientific research to support the field seemed to bother America's courts. By the early 1990s, judges were welcoming bite mark testimony into courts across the country. [In 1990](#), the Supreme Court in Arizona — the state where Ray Krone would soon be wrongly convicted because of bite mark evidence — ruled that so long as a bite mark expert has been accredited, the state's courts no longer needed to submit their opinions to a *Frye* test. (See [part two](#) for more about the *Frye* standard.) A 1995 article in the [Santa Clara High Technology Law Journal](#) found that as of 1992, bite mark matching had been admitted as evidence in 193 criminal cases across the country and had been accepted by appellate courts in more than half the states.

There had been a few critics in the 1970s and 1980s, but the practice wasn't yet widespread enough for anyone to care. But by the early 1990s, bite mark analysts were testifying often enough to begin to raise some alarms.

Michael Bowers was one of those early critics. Bowers is a practicing dentist in Ventura County, Calif. He also has a law degree and serves as a consultant with the Ventura County Sheriff's Office and the Ventura County Medical Examiner. Bowers joined the American Board of Forensic Odontology in 1989. While he was a member of ABFO, Bowers wrote articles for the organization's newsletter and served on its board of directors and its credentialing committee.



Michael Bowers

But Bowers grew increasingly blunt in voicing his concerns about bite mark matching. [In a 1996 article](#) for the newsletter of the American Society of Forensic Odontologists (ASFO is an educational organization, and while there are many overlapping members between the ABFO and the ASFO, the ASFO doesn't offer board certification), Bowers didn't mince his words. He wrote that the "physical matching of bite marks is a non-science which was developed with little testing and no published error rate. It is supported by anecdotalism and a minuscule number of inadequate population studies."

[In another article](#) for the ABFO newsletter the same year, Bowers encouraged the group to rein in its experts. He urged more cautious testimony, at least until the underlying assumptions behind bite mark matching could be verified or disproved with science-based research.

There is no reliable way of saying, other than colloquially, that one or more tooth marks seen in a wound are conclusively unique to just one person in the population. Because of this vacuum, value judgements abound in our discipline. Proffering the testifying expert's years of experience is a popular means of "proving" uniqueness." He or she has seen more bitemarks. This misses the scientific point and is misleading to a lay jury that is given the responsibility of filtering good science from bad. The confidence level of expert testimony must be based on data available to BOTH the dentist and the court. This scientific data does not exist. Until this changes, the admissibility of bitemark analysis should be limited to a "possible" determination. The odontologist doesn't have a basis to expand an opinion beyond that.

. . . Research must progress to raise the current anecdotal level of individuation in contemporary bitemark analysis. A concerted effort to find funding and research facilities has to be done by this organization. It will be the cheapest assurance that our future in court will be positive, rather than controversial. After the research is done, the “possible” might then become “unique.”

That research didn't happen. In the early 1990s, the FBI set up more than 20 scientific working groups to study and improve the practice of more than two dozen forensic disciplines. Some of those groups uncovered the flaws in forensic analyses that inspired a [National Academy of Sciences \(NAS\) report](#) in 2009. Others weren't as successful. But notably, forensic odontology is the only widely used forensic discipline that wasn't subjected to the scrutiny of a working group at all.

As Bowers watched the ABFO and its membership duck serious scientific scrutiny, his criticism grew stronger, and his relationship with the organization began to sour. In 1999, he conducted a bite mark “workshop” at an American Academy of Forensic Sciences (AAFS) conference. Bite mark analysts were asked to match bite marks with the teeth that made them. More than 60 percent made an incorrect identification. Bowers then published the results of his test, further agitating the bite mark community. To this day, ABFO officials refer to that 1999 test as a “workshop,” not a competency test, and insist that the results were meaningless.

“That criticism might have some validity if ABFO administered its own competency tests,” says Chris Fabricant, director of strategic litigation for the Innocence Project. “But the organization has shown no interest in testing to see if two or more of its own certified experts can look at the same set of bite marks and independently come to the same conclusion. There's no reliability in these methods. Therefore, there's no way to test for accuracy. That means this isn't science. And if it isn't science, it doesn't belong in the courtroom.”

Increasingly frustrated with ABFO's disinterest in keeping unscientific testimony out of criminal cases, Bowers resigned from the group in 2011. Since then, he has continued his criticisms in journal articles, presentations at conferences, a textbook, court testimony and a blog he runs with fellow dentist and bite mark matching critic David Averill.

But the pro-bite mark matching community began to fight back.

The first shot at Bowers came from Carl Hagstrom and Russell Schneider, two bite mark specialists who testified for prosecutors in [the 1986 trial of Bennie Starks](#), an Illinois man found guilty of raping a 69-year-old woman. The testimony from Hagstrom and Schneider was the primary evidence against Starks. In 2000, DNA testing on semen found in the woman's underwear excluded Starks as the source of the semen. But citing the bite mark testimony, Lake County, Ill., assistant state's attorney Michael Mermel insisted that Starks was guilty and prevented the DNA profile created from the semen from being run through CODIS, the federal DNA database. Mermel added that if the semen had been taken from the woman's vagina instead of her underwear, he'd be advocating for Starks's release himself.

Mermel's promise was put to the test in 2006, when a vaginal swab previously thought to have been lost was found and tested. Again the DNA profile excluded Starks. This time, Starks's conviction was overturned by an appeals court. But despite his earlier statement, Mermel again insisted that Starks was still guilty, and again he cited the bite mark testimony from Hagstrom and Schneider. He kept Starks in prison pending another trial, positing that Starks must have bitten the woman while someone else raped her, or alternately, that the victim must have had consensual sex shortly before the incident. (The victim, who survived the attack, insisted that she hadn't.)

Mermel was forced to resign in 2011 after [an unflattering New York Times Magazine feature](#) cited Starks's conviction among other cases in which Mermel had concocted implausible theories after DNA testing revealed a likely wrongful conviction. Mermel's boss was defeated in the 2012 election and shortly after taking office the following January, the new Lake County district attorney finally dropped the charges against Starks.

Bowers cited the Starks case in a presentation at the 2011 AAFS conference in Chicago. Hagstrom and Schneider sued Bowers in 2011, claiming that his presentation caused them "ridicule and a loss of business." The two dentists argued that the appellate court never explicitly ruled that their bite mark testimony was flawed, only that Starks deserved a new trial. This was true. But given the DNA

evidence, it didn't need to. The men's lawsuit against Bowers implicitly relied on the discredited Mermel's still-unlikely theory: Starks must have bitten the woman while someone else raped her. Bowers settled the suit for \$1,250 with each dentist, an amount significantly lower than what it would have cost him to litigate.

In October 2013, Bowers published the book "[Forensic Testimony: Science, Law and Expert Evidence](#)," which includes essays by Bowers and other critics of modern forensics. The essays are meticulously researched and generally skeptical of a wide array of forensic disciplines. It comes down especially hard on pattern matching analysis and on bite mark matching in particular. The book was an honorable mention for [a PROSE Award in law and legal studies](#).

Four months after the book was published, Bowers was dropped from the editorial board of the Journal of Forensic Sciences, the AAFS flagship publication. In an e-mail, editor Michael Peat told Bowers he had been "termed out" of his position due to the "need to bring on new members." Peat did not respond to a request for comment, but other forensic specialists said in interviews for this article that the timing of Bowers's ouster is suspicious. They point out that another member of the editorial board, Robert Barsley, is a bite mark analyst who has held numerous leadership positions at both the ABFO and the AAFS. The editorial board also includes Ken Melson, chair of the ethics committee that would later recommend Bowers's ouster from AAFS. The board does include at least one other bite mark skeptic. So it's at least plausible that dropping Bowers from the board wasn't related to his criticisms of pattern-matching forensic specialties. Others speculated that with the building tension between Bowers and the ABFO, the journal may have just wanted to avoid controversy.

But then came the ethics complaint. In November 2013, two weeks after Bowers's book was published and a month after Gerard Richardson [became the latest bite mark exoneree](#), recently elected ABFO President Peter Loomis filed a six-page complaint against Bowers with the AAFS ethics committee. Loomis cited three cases in which he claimed Bowers had violated AAFS ethical regulations, one in 2008 and two in 2010. Loomis wasn't present at any of the proceedings where the alleged ethical violations occurred, nor were there any complaints filed against Bowers by

any of the attorneys or judges in those cases. The complaint also came as Bowers has been preparing to testify as an expert witness in two lawsuits against bite mark analysts brought by people who had been convicted by bite mark testimony and were exonerated after serving long terms in prison.

“There’s no doubt in my mind that the ethics complaint was retaliation,” says Fabricant. “Look at the timing. The complaint came a month after the high-profile exoneration of Gerard Richardson. Of all the exonerations in bite mark cases, of all the perversions of justice caused by bite mark analysts over the years, the first ethics complaint an ABFO officer ever files with the AAFS is against one of the most effective critics of bite mark analysis. This was an attempt to silence a critic.”

Michael Saks, an Arizona State University law professor and expert on forensic evidence, agrees. “It’s a beautiful example of the adversarial process in action. When you first read it, the complaint sounds as if it could have some merit. Then you read Bowers’ response. You get the context, and you realize that there’s no there there. The complaint is either badly mistaken, or it’s a transparent attempt to purge someone who has been a problem for them.”

“Bowers has been a thorn in the ABFO’s side for forever,” says Michael Risinger, a Seton Hall University law professor who specializes in law, science and expert testimony. “This certainly looks like an attempt to purge a critic. ”

To understand the significance of the complaint, it’s important to understand that the AAFS is the largest forensics organization in the country. It is the main professional body of the forensics community. While they’re technically private organizations, groups such as the AAFS and the ABFO have enormous influence over who does and doesn’t get to testify in court. “An AAFS finding that Bowers committed ethical violations would render him useless as an expert witness,” Saks says. Even if Bowers could persuade judges to continue certifying him, an opposing attorney could use the finding to discredit him to the jury.

At the time Loomis filed his complaint, the chairman of the AAFS ethics committee was Haskell Pitluck, a retired Illinois state court judge. As it turns out, Pitluck is also the legal counsel for the ABFO and a nonvoting member of the ABFO’s ethics

committee. One year before Loomis's complaint, the ABFO established the "Haskell Pitluck Award," which the organization presents annually to someone who has "served the ABFO community in an exemplary fashion." The first ABFO Haskell Pitluck Award was given in February 2012. The first recipient: Haskell Pitluck. And the person who would determine whether there was any merit to the complaint filed by the ABFO president against the ABFO's biggest critic? Haskell Pitluck.

"It was such an obvious conflict of interest, all I could do was laugh," Bowers says. He and his attorney requested that Pitluck recuse himself and that the AAFS bring in a neutral arbiter. Pitluck refused. He then found probable cause for Loomis's complaint. The AAFS would proceed with an ethics investigation of Bowers.

Loomis's complaint alleges 13 ethical violations committed by Bowers over 13 years. But a close look at the accusations reveals them to be rather thin. For example, Loomis alleges that in the 2008 case *California v. Frimpong*, Bowers first claimed he could not exclude the defendant as the source of a bite mark, then, after the defense paid him, claimed he could exclude the defendant. Loomis is alleging that Bowers is a "hired gun" willing to change his mind in exchange for pay.

In his response, Bowers explains that his initial opinion was based on no more than a photo of a bite mark that he felt lacked enough detail to draw any conclusions at all. He wasn't sent the dentition evidence taken from the defendant until the night before the trial. Because he didn't have sufficient time to properly analyze the new evidence, he "could not exclude" the defendant as the source of the bite mark. Consequently, he didn't testify. After the trial, Bowers had time to do a more thorough analysis with more evidence and came to the conclusion that the defendant could be excluded.

To say a defendant "can't be excluded" is another way of saying that the available evidence doesn't say much either way. It doesn't indicate guilt, but it doesn't exonerate either. Bowers explains in his response that he didn't "change" his opinion; he went from "no opinion" to "having an opinion," but only after he was presented with more evidence and given time to analyze it properly. This would seem to be exactly what we'd want from a conscientious expert witness.

Loomis also alleged an ethics violation because a judge once found Bowers's testimony to be "not credible." But this is hardly evidence of an ethical violation. In fact, because of the very subjectivity of bite mark evidence, these cases will often feature two expert witnesses offering two diametrically opposed opinions. During a bench trial or a hearing on admissibility of bite mark evidence, the judge will naturally have to rule for one side or the other. Judicial opinions aren't scientific pronouncements, and in fact, as previously noted in this series, they're often ignorant of or oblivious to the prevailing science. On many occasions, judges have vouched for the credibility of bite mark experts in upholding the convictions of defendants who were later proved innocent by DNA testing.

But even this is beside the point. Even if the judge had been correct about Bowers's credibility, this sort of ruling isn't proof — and doesn't claim to be proof — that the expert who testified for the losing side was unethical. It really only means that he failed to persuade the judge. And as Fabricant points out, it also magnifies the selectivity of Loomis's complaint: "You have two-dozen cases where a judge or a prosecutor found a bite mark analyst to be 'credible,' after which the suspect was completely exonerated of the crime. Some of these people spent decades in prison. Where are the ethics complaints against them? Michael Bowers helped exonerate many of those people. But he's the one hit with a complaint, because a judge in one case didn't find him credible? It's just brazen."

The most serious allegation in Loomis's complaint is that Bowers altered or fabricated evidence in the *Frimpong* case. Loomis's evidence for this charge is Bowers's testimony during a hearing for the 2010 case *Alabama v. Ramirez-Vitae*. In that case, Bowers told the judge that in the *Frimpong* case he had reversed the orientation of the suspect's teeth. Bowers's testimony to the judge about why he did this is somewhat ambiguous, and Loomis's complaint alleges that Bowers reversed the orientation in order to deceive. But to believe that, you'd have to believe that Bowers, a reputable expert witness with no prior allegations of ethical misconduct, not only deceptively and intentionally distorted evidence, but also openly boasted about doing so, directly to a judge, in a case two years later.

Bowers says he was open about what he was doing. He thought the state's experts had the orientation wrong themselves — that they had mistaken the upper teeth for the lower teeth. And in fact, during post-conviction, one of the state's own experts actually agreed with Bowers. The new expert, Greg Golden, disagreed with Bowers that when properly aligned, the marks excluded the defendant as a suspect. But he agreed with Bowers that the state's expert at trial (a different analyst) had misaligned the teeth and the bite marks.

In other words, the prosecution offered up two ABFO-certified bite mark analysts as experts, one at trial and one during post-conviction. The analyst at trial said the bite marks implicated the defendant. During post-conviction, the second analyst analyzed the same bite marks, only with the upper and lower teeth of the defendant switched. But he, too, said they implicated the defendant.

Bowers says he brought the case up at the Alabama hearing because it illustrated the absurdity of the entire field of bite mark matching. "I told the judge in the Alabama case that this was an example of how ambiguous bite marks can be. How you can have multiple theories with multiple conflicting assumptions and opinions, but all of them within the ABFO guidelines," Bowers says.

Obviously, an individual's lower teeth are going to leave different marks than his or her upper teeth. One might think that the president of the organization that sets the standards for bite mark analysis would be concerned about the fact that two of its members implicated the same defendant despite the fact that their analyses were done with opposing orientations of the defendant's teeth. Yet it's Bowers that Loomis has targeted, for calling attention to the problem.

I asked Loomis about his complaint against Bowers in a phone interview last year. He said that AAFS bylaws prohibited him from discussing any ethics proceedings, so he could neither confirm nor deny the existence of any complaint. He also expressed concern about the fact that I had obtained a copy of his complaint and cautioned me about publishing it. Later in the conversation he added that if, in theory, he had filed a complaint against Bowers, anyone who read it would be thoroughly convinced of Bowers's guilt.

“Dr. Bowers is not credible,” Loomis said. “I can’t confirm the existence of any complaint, but if there was one, and I could talk about it, I would change the minds of Bowers’ supporters.”

Loomis is right about the AAFS bylaws requiring confidentiality. But those bylaws are intended to protect the accused. Bowers stands as the accused and has asked for complete transparency. In his initial response to Loomis’s complaint, Bowers stated: “I waive all rights to confidentiality and hereby request a public hearing to adjudicate this matter . . . Moreover, I request the proceeding be videotaped, transcribed, and made available to the public.”

Pitluck eventually found probable cause for the complaint against Bowers to move forward. A hearing was scheduled for July 8, 2014, in a conference room at a Chicago hotel. By the time of the hearing, Pitluck’s term on the AAFS ethics committee had ended. He was replaced by Melson, a former federal prosecutor for 24 years who had most recently served as acting director of the federal Bureau of Alcohol, Tobacco, Firearms and Explosives. Melson [was reassigned from his position](#) in 2011 in the wake of the “Fast and Furious” scandal.

Despite the controversy surrounding his previous position, two forensics experts and advocates for forensics reform interviewed for this article say they considered Melson to be reputable and fair and initially considered him a good choice to chair the ethics committee. (Neither wished to be named.) In fact, Melson was also a president of AAFS in 2003-2004. In his “President’s Message” in the organization’s newsletter, he repeatedly emphasized the need for forensics reform, better certification and taking ethical obligations seriously.

When I first interviewed Risinger about the complaint last summer, he seemed confident that the AAFS would dismiss it. He said the organization had to treat the complaint seriously because there was a national spotlight on forensics at the moment. To disregard an ethics complaint — even one that appears to be retaliation against a whistleblower — would send the wrong message.

“In my opinion, the ethics complaint filed against Mr. Bowers is thin on its face, and without merit when viewed in the light of the responsive filing,” he said. “I know the

AAFS is committed to being a reliable agency of self-regulation in forensic science, and, as in other contexts, that means not only reliably convicting the guilty, but also reliably acquitting the innocent. Under these circumstances, I believe their process will come to the right conclusion in this case.”

But Melson would surprise Risinger and other forensic watchdogs with an astonishing proceeding that fell far short of any reasonable conception of fairness or due process.

It actually began before the hearing, when according to Bowers, Melson turned down all of Bowers’s discovery requests. When the hearing was just a couple of months away, Bowers’s attorney Gabriel Fuentes wrote to Melson to complain that he and his client still hadn’t been informed of what format the hearing would take, what evidence would be used against Bowers or who would be sitting in judgment of him. In fact, Fuentes wrote, Melson had turned over “absolutely no documents or information whatsoever.” From the time he first received notice of the complaint, Bowers had asked for an explanation of how each allegation against him violated AAFS ethical guidelines. Again, Melson refused. (Melson declined to be interviewed for this article, citing AAFS bylaws about confidentiality in ethics investigations.)

Fuentes was most concerned about Melson’s role in the hearing. In his letter, he complained that Melson had yet to make it clear whether he’d be acting as a prosecutor, as a representative of AAFS or as a judge in his position as chair of the ethics panel. The answer would turn out to be all three.

On the morning of the hearing, Bowers learned that Melson had actually met with Loomis the previous night. Not only that, but the purpose of the meeting was so that Melson could help Loomis prepare. Later, during the hearing, it was revealed that Loomis got the idea for the complaint after a conversation at a dinner party hosted by Golden — the same analyst who agreed with Bowers about the proper orientation of the bite marks in *Frimpong*. Golden also preceded Loomis as ABFO president and now sits on the group’s executive committee. In addition, Loomis revealed that it was Golden who brought up the *Frimpong* case, the heart of Loomis’s complaint. (Golden was the opposing expert in that case.) None of this had previously been disclosed to Bowers.

Paula Brunit, also a member of the ABFO executive committee, was also one of the ethics committee members who was sitting in judgment of Bowers last July. Brunit had also met with Melson and Loomis the night before the hearing — also to help Loomis prepare his testimony. None of this was disclosed to Bowers or his attorney until the morning of the hearing.

“So two of the people on this supposedly unbiased committee, including the chairman, had met with my accuser the night before to help him prepare his case,” Bowers says. He adds, wryly, “And they’re aghast that anyone would dare suggest they’re on a witch hunt.”

The proceedings only got more absurd from there. Melson ran the hearing, acting as both judge and prosecutor. There are surreal passages in the transcript in which Bowers’s attorney objects to a question Melson asks as Melson is playing the role of prosecutor. At that point, Melson takes on the role of the “neutral fact-finder,” or judge, and overrules the objection. It also includes passages in which Melson the prosecutor objects to questions by Bowers’s attorney — then slips into the role of Melson the judge to sustain his own objections.

“It was a Star Chamber,” says Fabricant, who attended the hearing. “I’ve never seen anything like it. At every turn, they failed to afford Bowers even minimal due process. It was outrageous.”

On Sept. 6, Melson sent Fuentes a letter informing him that the committee had ruled against Bowers on one count. It had determined that Bowers had “committed a fraud on the court” in the *Frimpong* case. The ethics committee recommended that Bowers be expelled from AAFS. Melson told Fuentes that he would forward a copy of the committee’s report to the AAFS president and board of directors.

Under AAFS bylaws, Bowers is permitted to make his own appeal to the board. The problem is that Melson has refused to let Bowers see a copy of his committee’s report. In other words, Bowers is allowed to make an appeal, but he doesn’t get to see what exactly it is that he’s appealing.

Moreover, Melson didn't specify on which of the allegations the committee ruled against Bowers. He still hasn't. So Bowers must not only appeal without seeing the committee's reasons for ruling against him, but he also must do so without knowing for certain exactly what the ethics committee thinks he did wrong. (Through the process of elimination, Bowers and his attorney are fairly certain that it's the complaint alleging Bowers altered evidence in the *Frimpong* case.)

Brandon Garrett, a law professor at the University of Virginia who specializes in criminal procedure and innocence cases, reviewed the transcripts of the hearing and found them astounding. He submitted a declaration on Bowers's behalf. In his declaration, Garrett wrote that the entire adjudicative process "failed to satisfy minimal, but fundamental, due process protections."

The AAFS [convenes for its annual conference](#) this month in Orlando. During the conference, the AAFS board will consider the charge against Bowers. If the board votes to uphold it and expel him, Bowers can appeal and ask the entire AAFS membership to vote on the matter.

(Note: [After the first of installment of this series ran on Feb. 13](#), the AAFS board voted on Monday to dismiss the charge against Bowers, against the recommendation of the ethics committee.)

After the ethics committee issued its recommendation, I spoke again with Risinger, the forensic evidence expert and law professor who initially seemed confident that Melson and his committee would do the right thing. He, too, was taken aback by what transpired during the hearing.

"Assuming that what I've heard about the hearing is correct, I was wrong to have as much faith as I did in the ethics process," he said.

Tussles with the Bushes

By 2009, just as the ABFO was battling Bowers's increasingly vocal criticisms and the fallout from [the NAS report](#), the organization ran into another problem. In 2007 Mary and Peter Bush, a married couple who head up a team of researchers at the State University of New York at Buffalo, began a project to do what no one had done

in the three decades — conduct tests to see whether there’s any scientific validity to the bite mark evidence presented in courts across the United States.

The Bushes sought to test the two main underlying premises of bite mark matching — that human dentition is unique and that human skin can record and preserve bite marks in a way that allows for analysts to reliably match the marks to a suspect’s teeth. The Bush team was the first to apply sophisticated statistical modeling to both questions. It was also the first to perform such tests using dental molds with human cadavers. Previous tests had used animal skins.

When they first set out on the project, the Bushes received preliminary support from some people in the bite mark analyst community. “Franklin Wright was the ABFO president at the time,” says Mary Bush. “He visited our lab, and then put up a message praising our work on the ABFO website.” They also received a small grant from the ASFO, the discipline’s non-accrediting advocacy and research organization.

“There was a lot enthusiasm at the outset,” says Fabricant. “I think some analysts were excited about the possibility of getting some scientific validation for their field.”

But when the Bushes began to [come back with results](#) that called the entire discipline into question, that support quickly dried up.

The Bushes’ research found no scientific basis for the premise that human dentition is unique. They also found no support for the premise that human skin is capable of recording and preserving bite marks in a useful way. The evidence all pointed to what critics such as Bowers had always suspected: Bite mark matching is entirely subjective. The Bushes’ first article appeared in the January 2009 issue of the *Journal of Forensic Sciences*. The couple have since published a dozen more, all in peer-reviewed journals.

Outside of ABFO and their supporters, the Bushes’ research has been lauded. “I think there’s a chance that because of the Bushes’ research, five years from now we aren’t going to be talking about bite mark evidence anymore,” says Risinger. “It’s that good. Their data is solid. Their methodology is solid. And it’s conclusive.”

Other legal scholars and experts on law and scientific evidence interviewed for this article shared Risinger's praise for the Bushes' research but were less optimistic about its implications, in part because the criminal justice system so far hasn't recognized the significance of their work.

But from a scientific standpoint, the Bushes' research was a direct and severe blow to the credibility of bite mark analysis. At least initially, it threatened to send the entire field the way of voice print matching and bullet lead analysis, both of which have now been discredited. And so when defense attorneys began asking the couple to testify in court, the bite mark analysts fought back with [a nasty campaign to undermine the Bushes' credibility](#). In a letter to the editor of the Journal of Forensic Sciences, seven bite mark specialists joined up to attack the Bushes in unusually harsh terms for a professional journal. When that letter was rejected for publication, five of the same analysts wrote another. That, too, was rejected. A toned-down but still cutting third letter was finally published.

In the unpublished letter dated November 2012, the authors — all bite mark analysts who hold or have held positions within ABFO — declared it “outrageous that any of these authors would go into courts of law and give sworn testimony citing this research as the basis for conclusions or opinions related to actual bite mark casework, especially considering that no independent research has validated or confirmed their methods or findings.”

Of course, critics would say this was a bit of rhetorical jujitsu — that the last clause could describe exactly what bite mark analysts have been doing for 35 years. For emphasis they added, “This violates important principles of both science and justice.” In the other letter, the authors referred to the Bushes' testimony in an Ohio case, which was based upon their research, as “influenced by bias” and “reprehensible and inexcusable.”

The primary criticism of the Bushes' research is that they used vice clamps to make direct bites into cadavers that were stationary through the entire process. This is quite a different scenario than the way a bite would be administered during an attack. During an assault, the victim would probably be pulling away, causing the teeth to drag across the skin. For the Bush tests, the clamp they used to make the

bites moved only up and down. A human jaw also moves side to side. A biter might also twist his head or grind his teeth. A live body will also fight the bite at the source to prevent infection, causing bruising, clotting and various other defenses that would alter the appearance of the bite.

“We acknowledge that our lab tests are different from how bites are made in the real world,” says Mary Bush. “But to the extent that our tests differed, they should have made for better preserved samples.”

In other words, the tests that the Bushes conducted made for cleaner, clearer bites that could be easily analyzed. If they were in error, they were in error to the benefit of the claims of bite mark analysts. And they still found no evidence to support the field’s two basic principles.

“That’s exactly right,” says Risinger. “If there was any validity to bite mark analysis at all, these tests would have found it. They gave the field the benefit of the doubt. The evidence just wasn’t there. Their data is very, very strong.”

To argue that the Bushes’ experiments should be disregarded because they weren’t able to replicate real-world bites is also an implicit acknowledgment that real-world bites aren’t replicable in a lab, and therefore aren’t testable. You won’t find many people volunteering to allow someone else to violently bite them for the purposes of lab research. Even if you could, a volunteer won’t react the same way to a bite that an unwitting recipient might.

The Bushes’ research not only failed to find any scientific support for bite mark matching, but it also exposed the fact that for four decades the bite mark community neglected to conduct or pursue any testing of its own. It put the ABFO and its members on the defensive. The bite mark analysts responded by intensifying their attacks on the couple and making the attacks more personal.

At the February 2014 AAFS conference in Seattle, the ABFO hosted a dinner for its members. The keynote speaker was Melissa Mourges, an assistant district attorney in Manhattan, one of the most outspoken defenders of bite mark matching in law enforcement.

Mourges already had a high profile. The combative, media-savvy prosecutor was part of the prosecution team featured in the HBO documentary [“Sex Crimes Unit,”](#) which followed the similarly named section of the Manhattan DA’s office, the oldest of its kind in the country. Mourges herself founded a cold-case team within that unit. [At the 2012 AAFS conference](#) she spoke on a panel called “How to Write Bestselling Novels and Screenplays in Your Spare Time: Tips From the Pros.” [At this year’s conference](#), she’ll be on a panel that’s titled “Bitemarks From the Emergency Room to the Courtroom: The Importance of the Expert in Forensic Odontology.” She’ll be co-presenting with Franklin Wright, the former ABFO president who initially supported the Bushes’ research.

Mourges was also the lead prosecutor in [State v. Dean](#), a New York City murder case in which the defense challenged the validity of the state’s bite mark testimony. In 2013, Manhattan state Supreme Court Judge Maxwell Wiley held a hearing on the scientific validity of bite mark evidence. Mary Bush testified about the couple’s research for the defense. It was the first (and so far the only) such hearing since the NAS report was released, and both sides of the bite mark debate watched with anticipation. In September 2014, Wiley ruled for the prosecution, once again allowing bite mark evidence to be used at trial. (I’ll have more on the *Dean* case in part four of the series.) Mourges’s talk at the ABFO dinner was basically a victory lap.

There’s no transcript of Mourges’s speech, but those in attendance say it was basically a no-holds-barred attack on Mary Bush. Cynthia Brzozowski has been practicing dentistry in Long Island for 28 years and sits on the ABFO Board of Directors. She practices the widely accepted form of forensic dentistry that uses dental records to identify human remains, but she doesn’t do bite mark matching, and she won’t testify in bite mark cases. Brzozowski was at the dinner in Seattle and says she still can’t believe what she heard from Mourges.

“Her tone was demeaning,” Brzozowski says. “It would be one thing if she had just come out and presented the facts of the case, but this was personal vitriol against the Bushes because of their research.”

According to Brzozowski, Mourges even went after Mary Bush’s physical appearance. “At one point, she put up an unflattering photo of Mary Bush on the overhead. I don’t

know where she got it, or if it had been altered. Mary Bush is not an unattractive person. But it was unnecessary. You could hear gasps in the audience. It was clear that she had chosen the least flattering image she could find. Then she said, ‘And she looks better here than she does in person.’ It was mean. I had to turn my back. I was mortified.”

Other ABFO members — including two other members of the board of directors — also complained, to both the ABFO and the AAFS. The complainants described Mourges’s attack on Bush as “malicious,” “bullying” and “degrading.” According to accounts of those in attendance, other members were also upset by Mourges’s remarks but didn’t file formal complaints for fear of professional retaliation.

A few weeks later, Loomis sent an e-mail to the ABFO Board of Directors to address the complaints. Loomis defended Mourges and her presentation. He described the dinner as a “convivial affair” where members can socialize, have a libation and “be entertained” by the invited speaker. He argued that “anyone who understands litigation” should not have been unsettled by the talk and described the presentation as “sarcastic, serious, and even light-hearted.” He stood by the decision of his predecessor, Greg Golden, to invite Mourges, calling it “a good decision,” adding, “I apologize to those who were offended. However, I do not apologize for the message.”

“‘Bullying’ is exactly what it is,” says Peter Bush. “We’re scientists. We’re used to collegial disagreement. But we had no idea our research would inspire this kind of anger.”

Loomis had good reason to know exactly what he’d be getting in Mourges. At the previous AAFS conference in Washington, D.C., Mourges heckled the Bushes during a panel in which they tried to explain their research. According to those in attendance, she brought a printout of Mary Bush’s testimony from the *Dean* case and essentially tried to continue her cross-examination in a public forum.

Even in her brief in the *Dean* case, Mourges went well beyond standard legal arguments to launch personal attacks at the critics of bite mark matching. At one point in the brief, she implies that Bowers is cut from the same cloth as the notorious bite mark charlatan Michael West. She notes that both have resigned from the ABFO

and that she finds it “a relief” that neither plans to testify in court again. (Note: Bowers says he doesn’t know where Mourges got this — he’s still testifying presently and plans to do so in the future.) She also references Bowers’s testimony in the *Frimpong* case, falsely stating that he “admitted publicly and under oath that he manipulated evidence,” a good indication that the attacks on Bowers and the Bushes have been well coordinated.

Mourges’s attempt to conflate the most notorious fraud in the annals of bite mark analysis with a man who has spent the past two decades trying to expose the field’s shortcomings is certainly audacious. Multiple advocates for forensics reform said it’s also completely unmoored from reality.

“It’s patently absurd,” says the Innocence Project’s Fabricant. “Michael Bowers is well-regarded and well-respected. His work was cited in the NAS report. To my knowledge, the only people who have ever questioned his ethics are the people he’s been trying to expose.”

(The Manhattan DA’s office did not respond to my requests to interview Mourges for this series.)

This is the way it has been for critics of bite mark matching. Despite the trail of innocents put behind bars — some of whom were nearly executed — it’s the critics who have been put on the defensive. They’re heckled and belittled at forensics conferences, are subjected to lawsuits and ethics complaints, are attacked in court briefs and can expect their professional reputations to be called into question.

Ian Pretty testified for Bowers at the AAFS hearing. Pretty is a professor of public health dentistry at the University of Manchester in the United Kingdom. He’s somewhat critical of bite mark matching but less vocal about his objections than someone like Bowers. He also chairs the AAFS odontology section. At the hearing, Pretty alluded to the treatment of Bowers and the Bushes and said he feared that the attacks on them would chill critics and stifle an open debate.

“One thing that I have noticed and I’ve become increasingly concerned about is the tone in which . . . certain [individuals’] research has been received,” Pretty said. “I’ve

found that the discourse around our scientific sessions has become more aggressive than I would like to have seen.” He added that “there’s been somewhat of an attack on the ability for people to speak freely.” He also worried that the hearing would create a new method of attacking critics through the ethics process, “that we will have situations where people are concerned about what they say, be it in court, be it in depositions, be it in an Academy meeting, [they’ll] fear that they will be brought in front of this Ethics Committee for expressing an opinion.”

“We were naive going into it all,” says Mary Bush. “We thought we were providing research that would help prevent innocent people from getting convicted. We expected disagreement, but we expected polite, academic disagreement. We never expected the response to be so vitriolic.”

That vitriol has been persistent. In June 2013, Fabricant moderated a panel on forensics at a New York City conference hosted by the American Bar Association. Mary and Peter Bush were on the panel. During the question-and-answer period, the Bushes were once again subjected to some pointed criticism from a member of the audience. He derided the Bushes’ research and defended bite mark matching.

That audience member was Ira Titunik. The following month, DNA testing [exonerated Gerard Richardson](#), the man Titunik’s bite mark testimony had put in prison for 20 years.

Addendum: After this post was published, the office of Manhattan District Attorney Cyrus Vance sent the following statement:

Melissa Mourges is a veteran prosecutor and a nationally recognized leader in her field. As Chief of the Manhattan District Attorney’s Forensic Science/Cold Case Unit, she has solved dozens of cold case homicides, including two recently attributed to “Dating Game” serial killer Rodney Alcala. In addition to being a Fellow at the American Academy of Forensic Sciences, ADA Mourges has also served as co-chief of the DNA Cold Case Project, which uses DNA technology to investigate and prosecute unsolved sexual assaults. As part of that work, she

pioneered the use of John Doe indictments to stop the clock on statutes of limitation and bring decades-old sexual assaults to trial. Her work and reputation are impeccable, and her record speaks for itself.

Part 4 (Feb 20th 2015)

The path forward on bite mark matching — and the rearview mirror

This is the last part of a four-part series. The first three parts can be found [here](#), [here](#) and [here](#).

The [2009 National Academy of Sciences report](#) that was highly critical of the way forensics is used in the courtroom was entitled “A Path Forward.” The words expressed the hope of the report’s authors that it would serve as a catalyst to spur scientific testing of forensic specialties, more vigorous policing of what expert witnesses say on the stand and the development of uniform standards and procedures, all pointing toward an ultimate goal of preventing more wrongful convictions caused by unsupported expert testimony.

Reform, of course, is a long process, but in the field of bite mark matching — which again was the forensics specialty the NAS report singled out for some of its harshest criticism — the “path forward” looks to be obstructed. That’s probably because with bite mark matching, the debate isn’t just about adopting better standards or practices, but also about whether the field should exist at all.

“Most people in forensic odontology are practicing dentists, or academics. They don’t make their living doing bite mark analysis,” says Michael Saks, an Arizona State University law professor who studies the role of science in criminal law. “They do it on the side. Many of these cases involve sex crimes and crimes against children. So they see themselves as avenging angels. They’re protecting the weak. They’re putting away the bad guys. Then along come critics like Michael Bowers or the Bushes, calling their good work into question. You can see why they’d be angry, even though Bowers and the Bushes are right.”

Perhaps that’s why courts and prosecutors have been so reluctant to acknowledge the field’s shortcomings as well. Since the NAS report was released, there have been several court challenges to the validity of bite mark evidence. So far, every challenge has been struck down.

In 2011, for example, a Pennsylvania [judge upheld the 1994 conviction](#) of John Kunco, who had been convicted of rape due in part to the testimony of bite mark analysts Michael N. Sobel and Thomas J. David. (David is a previous president of the American Board of Forensic Odontology.) In his closing argument, the prosecutor emphasized the importance of the testimony:

[T]here's no way, no way on this earth, for Mr. Kunco to explain how his tooth marks got on Donna Seaman's shoulder unless you accept the fact that he's the one who attacked and brutalized Mrs. Seaman. That's the only explanation, ladies and gentlemen. That's why the evidence is better than fingerprints or hair samples ... [T]he bite mark on Donna Seaman's shoulder was as good as a fingerprint. And I submit to you it was that, ladies and gentlemen, for all intents and purposes. Ladies and gentlemen, I'd submit to you that John Kunco should have just signed his name on Donna Seaman's back, because the bite mark on Donna Seaman's shoulder belongs to John Kunco.

The alleged bite marks on the victim's shoulder weren't actually examined by Sobel and David until five months after the rape, a length of time long enough for most wounds to heal. [In a 1994 article](#) for the Journal of Forensic Sciences, Sobel and David explained they were able to "recapture" a bite after so much time had passed. They wrote that they employed a technique using ultraviolet light to find, isolate and photograph the mark. They then used the photograph to match the marks to Kunco. The article included a footnote to cite the bite mark analyst who had pioneered the technique. That bite mark analyst: the discredited [Michael West](#).

(Thomas David is also quoted at length in Melissa Mourges's brief in the *Dean* case, discussed below.)

To win a new trial after conviction, an inmate must show that he or she has discovered new evidence, that the new evidence was not discoverable at the time of trial and that if the evidence had been available, the jury would probably have acquitted. The inmate must also file his or her petition within a year of when the new evidence was discovered or should have been discovered. Kunco's petition hinged on the NAS report and its findings on bite mark evidence. In denying Kunco's petition for a new trial, Judge Rita Donovan Hathaway acknowledged that there are problems

with bite mark analysis, but she found that the NAS report wasn't new evidence. Rather, it was based on older research for which Kunco had already missed his deadline to file.

Hathaway's ruling may have been correct on the law, but it underscores just [how difficult it can be to get a conviction based on bad science overturned](#). Many, many defendants in fact *had* challenged bite mark evidence based on the prior research and criticisms Hathaway ruled that Kunco should have discovered earlier. They, too, were denied. At this point, even the ABFO may disclaim Michael West. But his legacy in bite mark analysis continues to keep people in prison.

In the 2012 case [Coronado v. Texas](#), a state appeals court upheld bite mark evidence on the grounds that forensic odontology is a "soft science" and thus does not need to be subject to a more rigorous analysis. Under a 1998 state appeals court decision, "soft" sciences are admissible if they come from a credible field and if the expert is practicing the principles of that field. In determining that bite mark analysis is a credible field, the court cites the 1990 state appeals court decision upholding the conviction of David Wayne Spence. As noted previously in this series, Spence was convicted primarily due to bite testimony from Homer Campbell, a forensic odontologist who had participated in another wrongful conviction and had given preposterous probability statistics to the Arizona Supreme Court. [There were also significant doubts](#) about Spence's conviction. He was executed in 1998. In upholding that conviction, the Texas appeals court upheld bite mark evidence, in part because "our research has not yet led us to a reported case where bite mark evidence has been ruled not to be admissible evidence."

Here again a court upheld bite mark evidence in large part because it has always done so in the past. And it has always done so in the past because other courts had done so before that. As previously noted in this series, many of those precedent-setting cases were supposed to be limited in scope, were misinterpreted by later courts or actually involved suspects who were later exonerated. These opinions aren't scientific analysis so much as a jurisprudential version of the childhood game of Telephone.

The California Supreme Court then took things to new heights of absurdity in [the case of William Richards](#). In 1997, Richards was convicted of killing his wife, Pamela, due in large part to testimony from bite mark analyst Norman Sperber. He had looked at an autopsy photo of Pamela Richards's body and found a mark he thought was a bite. Sperber testified that a gap in the alleged bite was a match to William Richards's unusual dentition. More than a decade later, Sperber recanted his testimony, calling the gap a flaw in the photo. He added that he no longer even thought the bite was made by a human. Four other forensic odontologists said that the photo did not offer enough detail to provide a match to William Richards.

This was still not enough for the California Supreme Court to overturn Richards's conviction. In what the publication [California Lawyer called](#) "the worst opinion of the year," the majority ruled in 2012 that once he was in post-conviction, Richards had to prove that the evidence against him was false, not merely overstated. The bite mark analysts who advocated for him after his conviction could not rule him out as the source of the bite (if it was a bite at all); they could only say that the photo from which Sperber originally drew his conclusions was too blurry to prove that Richards was a match.

In other words, a bite mark analyst making grand claims from a blurry photo was good enough to convict Richards, but other analysts — including that same analyst who helped convict him — stating after the fact that the photo was inconclusive was not enough to free him. (At this week's American Academy of Forensic Sciences conference in Orlando, Sperber, who kept a man in prison for more than a decade before changing his mind, [received three lifetime achievement awards](#), one from the AAFS, one from the ABFO and one from the American Society of Forensic Odontology. The latter is a new award called the Norman D. Sperber Award for Forensic Dental Excellence.)

The most significant challenge to bite mark evidence since the NAS report was released came in *State v. Dean*, the New York case mentioned in [part three of this series](#). In 2013, attorneys for defendant Clarence Dean challenged the prosecution's plan to use bite mark evidence against their client. Manhattan state Supreme Court Judge Maxwell Wiley granted a hearing to assess the validity of bite mark matching.

It was the first such hearing since the NAS report was published, and both sides of the bite mark debate watched closely. Mary Bush testified for the defense, as did [Karen Kafadar](#), chair of the statistics department at the University of Virginia and a member of the National Institute of Standards and Technology's Forensic Science Standards Board.

The prosecutor in that case was Manhattan assistant district attorney Melissa Mourges, an aggressive 30-year prosecutor with a high profile. Mourges was featured [in a 2011 HBO documentary](#) and holds the title of chief of the District Attorney's Forensic Science/Cold Case Unit in what is arguably the most influential DA's office in the country. So her advocacy for bite mark matching is significant.

As reported in part three, Mourges has not only defended bite mark evidence but also seems to be on a campaign to denigrate its critics, going so far as to heckle scientific researchers Mary and Peter Bush at a panel, and then to personally attack Mary Bush during a dinner talk at a forensics conference. Her bite mark brief in the *Dean* case compared bite mark evidence critic Michael Bowers to the notorious bite mark charlatan Michael West. It was a particularly egregious comparison because Bowers had helped expose West back when he was still embraced by the ABFO.

In her brief, Mourges first encouraged Wiley to embrace the "soft science" approach to bite mark analysis used by the Texas court in *Coronado*. Conveniently, doing so would allow bite mark specialists to testify to jurors as experts with almost no scrutiny of their claims at all.

Mourges next argued that if the court must do an analysis of the validity of bite mark testimony, it do so on the narrowest grounds possible. When it comes to assessing the validity of scientific evidence, New York still goes by the older Frye standard, which states that evidence must be "generally accepted" by the relevant scientific community. The question then becomes: *What is the relevant scientific community?*

In her brief, Mourges urged Wiley to limit that community to analysts who "have actually done real-world cases." In other words, when assessing whether bite mark matching is generally accepted within the scientific community, Mourges says the only relevant "community" is other bite mark analysts.

Saks offers a metaphor to illustrate what Mourges is asking. “Imagine if the court were trying to assess the scientific validity of astrology. She’s saying that in doing so, the court should only consult with other astrologers,” he says. “She’s saying the court shouldn’t consult with astronomers or cosmologists or astrophysicists. Only astrologers. It’s preposterous.”

Saks, who submitted a brief in the case on behalf of Dean, also offers a real-world example: the now-discredited forensic field of voiceprint identification. The FBI had used voiceprinting in criminal cases in the 1970s but discontinued the practice after an NAS report found no scientific support for the idea that an expert could definitively match a recording of a human voice to the person who said it.

“If you look at the Frye hearings on voiceprint identification, when judges limited the relevant scientific community to other voiceprint analysts, they upheld the testimony every time,” Saks said. “When they defined the relevant scientific community more broadly, they rejected it every time. It really is all about how you define it.”

In urging Wiley to only consider other bite mark analysts, Mourges also casts aspersions on the scientists, academics and legal advocates urging forensics reform. She writes:

The make-up of the relevant scientific community is and should be those who have the knowledge, training and experience in bitemark analysis and who have actually done real world cases. We enter a looking-glass world when the defense urges that the Court ignore the opinions of working men and women who make up the ranks of board-certified forensic odontologists, who respond to emergency rooms and morgues, who retrieve, preserve, analyze and compare evidence, who make the reports and who stand by their reasoned opinions under oath. The defense would instead have this Court rely on the opinions of statisticians, law professors and other academics who do not and could not do the work in question.

Of course, one needn’t practice astrology or palm reading to know that they aren’t grounded in science. And if police and prosecutors were to consult with either in a case, we wouldn’t dismiss critics of either practice by pointing out that the critics themselves have never read a palm or charted a horoscope.

Mourges also attempts to both discredit the NAS report and claim that it isn't actually all that critical of bite mark analysis. For example, she laments that the report was written by scientists and academics, not bite mark analysts themselves. This, again, was entirely the point. The purpose of the NAS report was to research the scientific validity of entire fields. If it were written by active practitioners within those fields, every field of forensics would have been deemed valid, authoritative and scientifically sound.

Mourges also misstates and mischaracterizes what the report actually says. She writes in one part of her brief that "the NAS report does not state that forensic odontology as a field should be discredited." That's true. But bite mark matching is only one part of forensic odontology. The other part, the use of dental records to identify human remains, is widely accepted. What the report makes abundantly clear is that there is zero scientific research to support bite mark analysis in the manner it is widely practiced and used in courtrooms.

In another portion of the brief, Mourges selectively quotes part of the the report, cutting out some critical language. She writes:

When Dr. Kafadar and her NAS committee created the NAS report, they wrote a summary assessment of forensic odontology. In it they said that "the majority of forensic odontologists are satisfied that bite marks can demonstrate sufficient detail or positive identification ...

That ellipsis is important, as is the word that comes before the quote. Here's the passage quoted in full:

Although the majority of forensic odontologists are satisfied that bite marks can demonstrate sufficient detail for positive identification, no scientific studies support this assessment, and no large population studies have been conducted. In numerous instances, experts diverge widely in their evaluations of the same bite mark evidence, which has led to questioning of the value and scientific objectivity of such evidence.

Bite mark testimony has been criticized basically on the same grounds as testimony by questioned document examiners and microscopic hair examiners. The committee received no evidence of an existing scientific basis for identifying an individual to the exclusion of all others.

The report only acknowledges the near consensus within the community of bite mark analysts for the purpose of criticizing them. Mourges's selective quotation implies that the report says the relevant scientific community accepts bite mark matching. The full passage reveals that the report is essentially pointing out just the opposite: The insular community of bite mark analysts may believe in what they do, but the larger scientific community is far more skeptical.

One common tactic that shows up in Mourges's brief and has also shown up in defenses of bite mark analysis across multiple forums — court opinions, forensic odontology journals and public debates — is a sort of meticulous recounting of the care and precision into which bite mark analysts collect and preserve evidence as well as the scientific-sounding nomenclature used by the field's practitioners. Mourges devotes more than 10 pages to laying out the procedures, methods and jargon of bite mark matching.

In any field of forensics it's of course important that evidence be carefully handled, properly preserved and guarded against contamination. But to go back to the astrology metaphor, even the most careful, conscientious, detail-oriented astrologer . . . is still practicing astrology. If the field of bite mark analysis cannot guarantee reliable and predictable conclusions from multiple practitioners looking at the same piece of evidence, if it cannot produce a margin for error, if its central premises cannot be proved with testing, then it doesn't matter how pristine the bite mark specimens are when they're analyzed or what the mean number of syllables may be in each word of a bite mark analyst's report.

But ultimately, Mourges was effective. In September 2013, Wiley rejected the defense challenge to bite mark evidence in the *Dean* case. He never provided a written explanation for his ruling. In an e-mail, Joan Vollero, director of communications for the Manhattan District Attorney's Office, wrote of the ruling: "Following the months-long Frye hearing, Judge Wiley denied the defendant's motion to preclude the bite

mark evidence, finding that the field of bite mark analysis and comparison comports with New York State law.”

Moving on, but without looking back

Generally speaking, since the NAS report came out, the courts have treated other pattern-matching disciplines in the same way they’ve treated bite mark matching — they haven’t really factored in the NAS report at all. There have been some exceptions, but by and large even with the exceptions, the courts have merely limited the degree to which an analyst can declare a “match.” That is, a court may rule that an expert witness can say a bite mark or hair fiber is consistent with the defendant, but they can’t say it could only have come from the defendant.

In some cases, the courts (and defenders of the forensic disciplines under fire) have noted that the NAS report itself doesn’t explicitly call on the courts to invalidate any field of forensics. That’s true, but that wasn’t the report’s intent. The intent was to draw attention to the lack of scientific research to support what many forensic analysts have been claiming in court — its purpose was to review the science, not to change existing law. The fact that the NAS didn’t explicitly tell the courts to invalidate fields such as bite mark analysis doesn’t mean that the NAS report was validating them. Nor does it mean that judges weren’t to take the report into consideration when conducting analyses on admissibility.

But Mourges made that very argument in her *Dean* brief. Other prosecutors have made it as well. To support it, they often cite congressional testimony given by Harry T. Edwards, a federal judge with the U.S. Court of Appeals for the D.C. Circuit and the chairman of the NAS committee that wrote the report. [In a speech](#) at a Yale conference on technology and law, Edwards thoroughly refuted this argument.

I recently had an opportunity to read several briefs filed by various U.S. Attorneys’ offices in which my name has been invoked in support of the Government’s assertion that the Committee’s findings should not be taken into account in judicial assessments of the admissibility of certain forensic evidence . . .

This is a blatant misstatement of the truth. I have never said that the Committee's Report is "not intended to affect the admissibility of forensic evidence . . . To the degree that I have commented on the effect of the Report on admissibility determinations, I have said something quite close to the opposite of what these briefs assert.

What Edwards did say was that judges will continue to follow the law — that they'll continue to use the Daubert and Frye analyses. His point was that he hoped the NAS report would inform those analyses.

[T]here is a critical difference between saying that judges will continue to apply existing legal standards . . . and saying that the Report should have no effect on how judges apply those standards. I most certainly never said, or even suggested, that judges should not take into account the new information provided by the Report in assessing the validity and reliability of forensic evidence while making admissibility determinations. Claims to the contrary are without basis in fact and utterly absurd.

That speech was in 2010. Mourges filed her brief in *Dean* in 2013.

There are at least a few hopeful signs that some policymakers are taking notice of the effects of bad forensics. After the California Supreme Court ruling in the Richards case, the state's legislature passed a law that makes it easier for inmates to challenge convictions based on bad science. William Richards is now mounting another challenge to his conviction under the new law.

Texas also recently passed a ["junk science" law](#), mostly in response to the faux-arson science used to [convict and execute Cameron Todd Willingham](#). And a federal judge in Wisconsin recently issued a well-informed opinion [striking down a conviction](#) based on handwriting analysis.

But these instances have been few and far between, especially in the courts. Michael Saks says it all goes back to asking judges to be the gatekeepers of science. He suggests a sort of national forensics panel that would evaluate new and existing forensic specialties and decide which have sufficient scientific support to be allowed

in the courtroom. “We need to move outside the courts,” he says. “Look at these forensic areas that even the government now admits have been discredited. Bullet lead composition, voice print analysis, and so on. The courts had been letting this stuff in for years. It took declarations from the scientific community to put an end to it. What does that tell us? It tells us that these decision shouldn’t be made by judges.” Edwards seems to agree. [In a speech last year](#), he cautioned that “Judicial review, by itself, will not cure the infirmities of the forensic community.”

While the courts have been slow to embrace the NAS conclusions, there are some indications that the ABFO is at least aware of the heightened public scrutiny. The organization now discourages members from using terms such as “scientific certainty,” “the only person in the world” or Michael West’s trademark phrase “indeed, and without a doubt.” Last year, the ABFO issued a “decision tree,” essentially a flow chart for bite mark analysts, and encouraged its members to use phrases such as “included,” “excluded,” “not excluded” and “the probable biter.”

The problem is that the flow chart still provides no objective criteria for making those assessments. It’s still an entirely subjective process. It’s still an “eyeball test.”

Moreover, according to Brandon Garrett, a University of Virginia law professor who studies innocence cases, it’s far from clear that such changes in language have much of an effect on jurors. “What we’ve found in jury studies is the precise phrasing an expert witness uses doesn’t really matter,” Garrett says. “Whether they say something careful like ‘this is consistent with the suspect’ or something more definitive like ‘this is a scientific match,’ all the jurors hear is an expert witness saying ‘this guy did it.’”

In our interview, ABFO President Peter Loomis also said that the ABFO no longer recommends that analysts claim they can match a biter to the exclusion of everyone else on the planet. Instead, it recommends only making positive identifications in what they call “closed populations” — that is, the police or prosecutor give the analyst a list of suspects, and the analyst then determines who is the “probable biter.”

“It’s a meaningless distinction,” says Chris Fabricant, director of strategic litigation for the Innocence Project. “It all depends on who is defining the closed population.

The Kennedy Brewer and Levon Brooks cases were both closed populations. And they still identified and convicted the wrong men.”

What troubles critics such as Fabricant most is that all this talk about moving forward cavalierly glosses over what has already happened. Even if you believe the current promises from the forensics communities that things are better now, if you don't change the structural failures that allowed bad science to convict innocent people in the first place, it's almost certain to happen again.

But there's also plenty of reason to question those assurances that things are better now. “The ABFO just dismisses these innocence cases as rogue examiners, or artifacts from a bygone era,” Fabricant says. “But they did immeasurable damage, not just to human lives, but to our jurisprudence. Where is the accounting for that? Where is the acknowledgment? Where is the reckoning?”

With the exception of West, the ABFO has never suspended or disciplined one of its members, even when their analysis contributed to a wrongful arrest or conviction. Several who have participated in such injustices are today outspoken advocates or hold leadership positions within the organization. For example, in 1998, bite mark matching by Franklin Wright helped convict Ohio police officer Douglass Prade of killing his wife. But in 2010, DNA testing on saliva taken from the bite mark excluded Prade. An Ohio judge gave Prade a new trial and released him before an appeals court overruled her and ordered Prade back to prison. Today, Wright serves on several ABFO committees, including the ethics, bite mark evidence and proficiency testing committees.

And the larger forensics community isn't exactly showing bite mark analysts the door. The absurd AAFS ethics hearing on Michael Bowers is a pretty good indication of that. (Note: After this series began on Friday, the AAFS board of directors voted to dismiss the ethics complaint against Bowers, overriding the recommendation of the organization's ethics committee. Bowers says the cost of his legal defense topped \$100,000.)

The theme of this year's AAFS conference is “Celebrating the Forensic Science Family,” which feels like a plea for unity in a field under criticism. [The event features](#)

at least eight panels focusing on bite mark evidence, plus the annual “Bitemark Breakfast,” with remarks by ABFO Vice President Adam Freeman and Jeffrey Ashton, prosecutor in the Casey Anthony case. (In conjunction with the conference, for \$700 the ABFO is also offering a one-day course in bite mark analysis.

Completion of the course will get you one credit in bite mark analysis toward qualification to take the group’s certification exam.)

Of the 20-plus speakers panels specifically related to bite mark analysis, all but three include practitioners in or proponents of the field. One session in defense of bite mark matching will feature Melissa Mourges and Franklin Wright. Neither Mary nor Peter Bush will be speaking, nor will Michael Bowers.

More troubling is that the federal reform apparatus put in place in the wake of the NAS report may have already been captured by the bite mark practitioners. Last October, the National Institute of Standards and Technology (NIST) [announced the members](#) of the subcommittee working group that would be studying the scientific validity of forensic odontology. Ten of the 16 members are either practicing bite mark analysts or people who have openly advocated the practice.

The committee includes ABFO president Peter Loomis, ABFO vice president Adam Freeman and ABFO general counsel Haskell Pitluck. It also includes Franklin Wright and David Senn, who testified for the prosecution in the *Dean* case. The chair of the committee is Robert Barsley, the former ABFO president, former AAFS president and bite mark analyst who helped put an innocent man in prison in the 1990s. The committee does also include a few bite mark skeptics, including Mary Bush. But they’re vastly outnumbered. In fact, the committee includes all five authors of the vitriolic letter to the editor of the *Journal of Forensic Sciences* that castigated Bush.

After the announcement of the subcommittee, Loomis sent out a celebratory e-mail to the ABFO membership. “It is quite an honor for the ABFO to be so well represented in the Odontology Subcommittee,” Loomis wrote. “Nine (9) of its sixteen (16) members are ABFO Diplomates with Dr. Robert Barsley as its chairman. Even the ABFO legal advisor, the Honorable Judge Haskell Pitluck was appointed as a member . . . Congratulations to all of you!”

If the subcommittee collectively approves of bite mark matching, then the ABFO and its supporters will be able to say that the field survived scrutiny even by the government committee put together to address forensics in the criminal justice system. What was supposed to be a process to rid the courts of dubious expert testimony will have become an official government imprimatur for that very sort of testimony. If it was already difficult to get judges to understand the limits of bite mark matching, de facto approval from a subcommittee put together by a government agency as reputable as NIST will make it nearly impossible. That the subcommittee was stacked from the start probably won't matter.

The move toward forensics reform was spurred by the revelations unveiled by DNA testing. The hard science of DNA analysis, which was born of the scientific method and extensively peer-reviewed, has shown time and time again that practitioners of the “soft sciences” of forensics were wrong, and have probably been wrong for decades. But DNA testing is only applicable in a small percentage of criminal cases, and the flaws in forensic analysis likely produce unjust outcomes just as often in non-DNA cases as they do in DNA cases. DNA testing was a wake-up call that the system is in need of repair. There probably won't be another one. So it's important that we learn the correct lessons, and that reform is done right.

Unfortunately, if bite mark matching is indicative of the larger reform process, the ultimate result of the wake-up call may end up being fairer, more just DNA cases — only because of DNA testing — but business as usual everywhere else. That not only calls into question the fairness and integrity of the criminal justice system, but also brings up the far more fundamental question of whether the system even *aspires* to be fair.

“We can't let go of the past, because the past is still the present,” says Fabricant. “You still have people in prison because of bite mark analysis. Some are on death row. There has been no accounting for the damage done. It sounds nice to talk about the path forward. But it would be foolish to embark on a long journey forward without a rearview mirror.”

Addendum: After the third installment in this series, the office of Manhattan District Attorney Cyrus Vance sent the following statement:

Melissa Mourges is a veteran prosecutor and a nationally recognized leader in her field. As Chief of the Manhattan District Attorney's Forensic Science/Cold Case Unit, she has solved dozens of cold case homicides, including two recently attributed to "Dating Game" [serial killer Rodney Alcala](#). In addition to being a Fellow at the American Academy of Forensic Sciences, ADA Mourges has also served as co-chief of the DNA Cold Case Project, which uses DNA technology to investigate and prosecute unsolved sexual assaults. As part of that work, she pioneered the use of John Doe indictments to stop the clock on statutes of limitation and bring decades-old sexual assaults to trial. Her work and reputation are impeccable, and her record speaks for itself.

April 8th 2015

[A bite mark matching advocacy group just conducted a study that discredits bite mark evidence](#)

In February, I posted [a four-part series](#) on the forensic speciality of bite mark analysis. The series looked at the history of the field, how it came to be accepted by the courts as scientific evidence despite the lack of any real scientific research to support its basic assumptions, the innocent people who have been convicted based on bite mark analysis and how the bite mark matchers, advocacy groups like the American Board of Forensic Odontology and their supporters have waged aggressive, sometimes highly personal campaigns to undermine the credibility of people who have raised concerns about all of this.

The series ran during the annual American Academy of Forensic Sciences convention in Orlando, Florida. That conference included a presentation by Adam Freeman, who sits on the executive board of the ABFO, and Iain Pretty, who is not a member of the ABFO, has been critical of bite mark analysis and chairs the AAFS committee on forensic odontology.* Freeman and Pretty were to present the results of a study they had designed with David Senn, another ABFO member and a proponent of bite mark analysis.**

Senn in fact was the main witness for New York County Assistant District Attorney Melissa Mourges [during a 2013 evidentiary hearing](#) on the scientific validity of bite mark analysis in *State v. Dean*. That hearing was the first to assess the science behind bite mark matching since the field came under fire in [a landmark 2009 report](#) by the National Academy of Sciences. Ultimately, Senn and Mourges prevailed. Judge Maxwell Wiley ruled that the evidence could be admitted at Clarence Dean's trial. In fact, to date, every court to rule on the admissibility of bite mark analysis has allowed it to be used as evidence. This, despite an ever increasing number of wrongful convictions, wrongful arrests, and lack of scientific research to support the field, and a new body of research suggesting that its core assumptions are false.

The study

All of this makes the presentation by Pretty and Freeman particularly interesting. In response to mounting criticism, last year the ABFO released a “decision tree” for bite mark specialists to follow when performing their analysis. The “tree” is basically a flow chart. It begins by asking if there is sufficient evidence to know whether or not a suspicious mark is a human bite. It then asks whether it is in fact a bite, then what distinguish characteristics are noticeable in the bite, and so on.

But the problem with bite mark analysis was never the lack of a flow chart. The problem is that there has never been any real scientific research to support its two main underlying premises — that human [dentition](#) is unique, and that human skin is capable of registering and recording that uniqueness in a useful way. And the research that *has* been done strongly suggests those two premises are not true. The flow chart was just adding a series of procedures to a method of analysis that is entirely subjective, and that lacks basic scientific quantifiers like probability and margin for error.

Yet the ABFO wanted to show that its flow chart worked. So last year, the organization put together an exam to prove its effectiveness. Pretty and Freeman, with consultation from Senn and others within the organization, gave 39 ABFO-certified bite mark analysts photos of 100 bite marks, then asked them to answer three preliminary questions, all based on the decision tree chart. The average analyst who participated in the study had 20 years experience as a forensic odontologist. Here are the three questions they were asked:

- Is there sufficient evidence in the presented materials to render an opinion on whether the patterned injury is a human bite mark?
- Is it a human bite mark, not a human bite mark, or suggestive of a human bite mark?
- Does the bite mark have distinct, identifiable arches and individual tooth marks?

That last question is asking if, once the analyst has determine that the mark is a human bite, the mark contains enough distinguishing features to be of value as evidence.

Interestingly, the intent of this study was to measure consensus, not whether the analysts were actually correct in their conclusions. Consensus is important, particularly in a field that relies so much on pattern matching and subjective analysis instead of quantifiable data. Consensus also shows predictability, which is also an important characteristic when assessing whether a field is legitimately based in science. There will of course occasionally be cases in which the evidence is ambiguous, but if a cross section of experts from a particular field consistently fail to reach consensus conclusions after looking at the same pieces of evidence, you have to start asking if the field is much more than guesswork.

But it's also notable that there was no effort here to determine the rightness or wrongness of the answers. For example, if 10 out of 10 analysts agree that a mark on human skin is a human bite, that would suggest that the decision tree succeeded at fostering consensus. If only 7 out of 10 agree, that's more troubling. But it would be even *more* troubling if the seven in the majority were also wrong.

The study didn't measure for accuracy in part because the photos were taken from actual cases, so for many of them, whether or not the bite is actually human has never been definitively determined. But as I pointed out in my original series, it's also keeping the field's tendency to be more concerned about methodology than veracity. ABFO conducts its certification exams in a similar manner. The candidates are evaluated only on their method of analysis, not on whether or not they're actually correct in matching a bite mark to the correct dental mold.

This reflects an ugly reality about the pattern-matching fields of forensics: Because they're so subjective, it isn't difficult for attorneys on either side of a case to find an expert who will testify to the conclusion they're looking for. In these fields then, the most important attribute in a witness is not that they be accurate, but that they *sound* accurate — that they be more convincing to a jury than the expert on the other side. Juries don't like wishy-washy witnesses. They like witnesses who seem sure of themselves, who speak with authority. But in forensic specialties as subjective

as pattern matching, certainty is a red flag. Most of the time, an honest witness *should* hedge, speak in probabilities, and avoid definitive conclusions. But this means that the least honest experts can often be the most persuasive, and there's a clear incentive for prosecutors and defense attorneys to seek them out.

Finally, note that this study also did not ask the examinees to actually match a mark to the teeth of an individual human being the way this sort of evidence would be presented in court. (A previous competency test administered by bite mark critic Michael Bowers in 1999 found a 60 percent error rate among the analyst test takers.) It only asked the three preliminary questions above.

So in sum, this study only measured the ability of ABFO-certified experts to come to a consensus, and only on the most basic, preliminary questions about a piece of evidence.

The results

Even within these limited parameters, and even when designed and administered by the field's biggest advocates, this study shows that bite mark analysis fails.

The first question — again, whether the test provided sufficient evidence to determine whether or not the photographed mark was a human bite — is the most basic question a bite mark specialist should answer before performing an analysis. Yet the 39 analysts came to unanimous agreement on just 4 of the 100 case studies. In only 20 of the 100 was there agreement of 90 percent or more on this question. By the time the analysts finished question two — whether the photographed mark is indeed a human bite — there remained only 16 of 100 cases in which 90 percent or more of the analysts were still in agreement. And there were only 38 cases in which at least 75 percent were still in agreement. (These figures come from my own examination of the raw data, as well as processing of the data done by the Innocence Project.)

By the time the analysts finished question three, they were significantly fractionalized on nearly all the cases. Of the initial 100, there remained just 8 case studies in which at least 90 percent of the analysts were still in agreement.

“These results are really disturbing,” says Paul Giannelli, a law professor at Case Western Reserve University who specializes in scientific evidence. Giannelli also serves on the [National Commission on Forensic Science](#), started by President Obama to address and remedy the shortcomings in forensic evidence outlined in that 2009 NAS report. “But they aren’t all that surprising. There have been a number of cases over the years in which one bite mark analyst testified that a mark was a human mark, while another testified it was something entirely different, for example a bug bite, or an indentation from a belt buckle.”

Peter Bush, who with his wife Mary heads up the University of Buffalo research team that has cast doubt on the integrity of bite mark analysis (and who [has been attacked](#) by the community of bite mark analysts and their supporters for that research), agrees: “When there have been exonerations of people convicted with bite mark evidence, the forensic odontologists have said that the problem is with the analysts — that they’re rogue or incompetent experts who didn’t do the analysis properly. This is just another piece of evidence that’s it’s both of these things. It’s the improper analysis, but it’s also the very nature of the evidence itself.”

To put these results in perspective, it might help to ask what might have happened if a similar exam had been given to specialists from a more science-based field of forensics, such as DNA analysis.

“It would be difficult to set up a DNA test that was exactly the same, but if you could, you’d see overwhelming agreement,” Giannelli says. “I’d expect it to be unanimous. And on the questions where it wasn’t unanimous, you’d be able to go back and find the source of the problem — whether it was tainted evidence, or some glitch in the exam. With bite mark analysis, you can’t really even go back, because it’s just a subjective disagreement over what the analysts are seeing.”

Chris Fabricant, the director of strategic litigation for the Innocence Project who is challenging bite mark evidence in several cases across the country, points to [a similar](#)

[study of fingerprint analysts](#) published in 2011 that found 99 percent agreement.

“Contrast that to some of the questions in this study, in which the level of agreement among the analysts was only slightly better than randomness,” Fabricant says.

The reaction

The bite mark community reacted with shock, disappointment, and ultimately an effort to suppress the results of the study. According to reliable sources within the ABFO, David Senn initially wanted to cancel the panel at the AAFS conference in which Freeman and Pretty were to present the results. These sources say Senn was astonished at the results, and told other members of the ABFO that he was “reeling” from them. He also apologized to the organization for his role in the study.

In the end, the organization did proceed with the presentation of the results, but then played down their significance. Newly-elected ABFO president Gary Berman briefly mentioned the study [in his quarterly message](#) to the organization’s members.

In order to improve the study of bitemarks the ABFO developed a decision tree to assist practitioners in the proper selection and pathways of analysis in bitemark analysis. The ABFO has conducted preliminary research, presented in Orlando, designed to evaluate the first step of a revised decision tree; statistical analysis of the study showed inconsistent overall agreement among the individuals who participated in the project. The ABFO in reaffirming its commitment to ensure accuracy in bitemark analysis is revising the decision tree to ensure reliable results by forensic dentists and will be conducting additional studies this year.

While it’s commendable that the ABFO is attempting to create guidelines that will “ensure reliable results,” it’s far more troubling that the current guidelines *don’t*, that the unreliable results those guidelines produce have for years been used and continue to be used in court, and that rather than running to courtrooms across the country to halt the convictions, imprisonments and pending executions based on the results, the organization continues to fight for its members’ ability to testify using the very analysis it now concedes is flawed.

In an email in response to my query, Berman blamed the poor design of the study for the results. “Post analyses of the results indicate that the design of the survey and the design of Step 1 of the decision tree may be flawed, and that an ABFO guideline term may be the root cause,” Berman wrote. “The troublesome term, ‘suggestive of a human bitemark’, is one of the currently recommended terms for confidence that a pattern is or is not a bitemark.”

Berman writes that some of the test-takers may have answered the first question in the affirmative (that there was sufficient evidence to show that the mark was a human bite), but then changed their mind as they answered the other questions. He writes, “they were loathe to go back and change the answer to the negative . . . Instead they selected the hedged, and available third choice, ‘suggestive of a human bitemark.’”

Berman’s explanation raises another common criticism made by skeptics of bite mark evidence, although perhaps he raised it inadvertently: Because so much of their value as expert witnesses relies on their credibility, there’s a strong disincentive to change their minds about their conclusions once they’ve made them, even when new evidence suggests they should. If an analyst is loathe to admit a mistake in an anonymous proficiency study, it doesn’t bode well for his ability to admit to a mistake after putting his name and reputation behind court testimony, or in an affidavit leading to an arrest.

Indeed, bite mark analysts have concocted some fantastic theories of culpability even after a suspect convicted based on their testimony was found not to be a match to the semen taken from a victim who was raped, or even to the saliva taken from the bite mark itself. On more than one occasion, for example, a bite mark analyst has confronted a DNA mismatch on semen taken from a rape victim by arguing that someone else must have raped the victim while the suspect implicated by their testimony must have held the suspect down and bit her.

But even more concerning than the results of the study itself, the ABFO has since decided to hold off on publishing those results until the organization can tweak the design of the study and conduct it again, a process that’s expected to take at least a year.

“If this were truly a science-based organization, I would not only expect them to be extremely troubled by the results of this study, I would expect them to want to publish the results,” says Paul Giannelli. “And sooner rather than later, so that they could be considered in any pending criminal cases in which bite mark evidence is a factor.”

The ABFO did release the raw data from the study in spreadsheet form to a few people, but won't release the presentation given at the AAFS meeting, nor will they publish the data in a journal or another publicly assessable format, at least until the completion of the second study. “We are in the process of modifying the decision tree, the language, and then we will be running the study again,” Adam Freeman wrote in response to an email query. “The results of both studies will then be sent to the [Journal of Forensic Sciences] for publication. The release of the presentation at this point would be premature. ”

Critics like Fabricant are skeptical. “If the results had been more to their liking, I can't imagine that they'd be objecting over the language in their own study, then taking another year or so to rerun the study to get more favorable results before releasing the data. In the meantime, people are suffering in prison. Some are fighting a death sentence.”

One of the pending criminal cases is the one mentioned at the start of this post: that of Clarence Dean, which is expected to go to trial sometime this year. As noted above, that case included an important evidentiary hearing in which a New York judge ruled that bite mark evidence is admissible and scientifically valid. Many other judges have made that ruling in the past, but this was the first such ruling since the publication of the NAS report in 2009. The prosecutor in Dean's case is Melissa Mourges, a fierce advocate for bite mark matching who, as I explained in the series in February, has not only advocated for bite mark analysis as a field, but has waged nasty, often highly personal attacks on those who have raised concerns about its legitimacy.

Mourges included a reproduction of the ABFO's “decision tree” in her brief for the bite mark hearing in the Dean case. She cited the tree as another example of the bite mark community's dedication to accuracy:

An important Guideline revision was added in February 2013 when the ABFO voted to include a bitemark flow chart or decision tree, included below. Properly used, the decision tree will guide forensic odontologists' investigatory paths leading to proper conclusions based on the quality of the bitemark and the teeth of the suspected biters. This new guideline offers specific recommendations for forming degrees of linkage conclusions based on the quality of both injury features and suspected biter dentitions.

Mourges attended the presentation by Pretty and Freeman at the AAFS conference in February. I reached out to the Manhattan DA's office where Mourges works to ask for her official reaction to the study. She didn't respond, but the office did issue a statement from Chief Assistant District Attorney Karen Friedman Agnifilo:

This study reinforces the importance of basing decisions on the best possible evidence available. The use of forensic odontology, properly performed, has been and continues to be a valuable tool to aid in the identification of assailants and can also be used to help place victims, many of whom are children, out of harm's way. Equally important, forensic odontology is used to exclude and exonerate suspects. Each time an injury is recognized as a bitemark and swabbed, investigators gain both DNA evidence and potential bitemark identification. Forensic odontology differs from DNA evidence in that it may not be dispositive, but it is probative. Undeniably, bitemarks have significant evidentiary value, which is why this type of evidence is admissible in all 50 states.

Agnifilo's statement conflates a lot of issues, and I examined several of the points she makes in the February series. But briefly, few would object to swabbing potential bite marks for DNA. Rather, critics of bite mark evidence fault the attempt to match marks on human skin to human teeth. The fact that bite mark evidence is admissible in all 50 states is convincing only if you believe the courts have done an adequate job of keep bad science out of criminal cases. Part two of the February series argues that they haven't. Agnifilo's point about the quality of the evidence is a good one. But it remains true that even with the most pristine bite mark evidence, there's no scientific research to support the contention that the marks we make with our teeth are individually, or to what extent they're unique, or that, even if they were unique, that

human skin is capable of preserving that uniqueness in a way that allows it to be analyzed.

The Manhattan DA's office insistence on standing behind bite mark evidence is interesting in and of itself. Current Manhattan DA Cyrus Vance, Jr., was elected in 2009 on a platform of "[community justice](#)," and won endorsements from criminal justice reform advocates — including, interestingly, [Peter Neufeld and Barry Scheck](#), co-founders of the same Innocence Project that is now feuding with Mourges in court. [On its website](#), Vance's office stresses the importance of fairness and sound evidence in preventing wrongful convictions:

The Manhattan District Attorney's Office spares no effort in seeking justice in every case that comes before it. Through the years and around the country, innocent men and women have been convicted of crimes they did not commit. This not only robs an innocent person of his or her freedom, it leaves a criminal on the street, free to commit more crimes.

To protect New Yorkers and ensure justice, District Attorney Vance created the Conviction Integrity Program in March 2010. The Program is comprehensive in scope, and is unique in purpose: not only does it address claims of actual innocence, it also seeks to prevent wrongful convictions from occurring . . .

The Conviction Integrity Policy Advisory Panel is comprised of leading criminal justice experts, including legal scholars and former prosecutors, who advise the Office on national best practices and evolving issues in the area of wrongful convictions.

The work of the Conviction Integrity Program, combined with the Office's commitment to using the most advanced scientific and investigative tools available, has made the cases brought by the Office stronger for victims and more fair for defendants.

But meanwhile, at least two of Vance's top lieutenants continue to defend a field of forensics that has contributed to at least 24 wrongful convictions and arrests around

the country, despite numerous studies showing it lacks any basis in science, including one organized by the field's leading advocacy organization.

Finally, [I noted in my original series](#) that last fall, the National Institute for Science and Technology announced the members of [the forensic odontology subcommittee](#) that will study the scientific validity of bite mark matching. The committee is one of several that will study various fields of forensics as part of the federal government's push toward reform in light of the 2009 NAS report. Incredibly, 10 of the 16 members are either practicing bite mark analysts, or are open advocates of the practice, including the chairman, Robert Barsley. It's a development one critic of bite mark matching likened to starting a committee to investigate the scientific validity of astrology, then stacking it with astrologists.

Pretty and Freeman's study is a major development in the field of bite mark analysis. It's one you'd think would attract the attention of the committee charged with investigating whether bite mark analysis is suitable for court. The committee held its first meeting on February 16. The results of the ABFO study were by then well known to the members affiliated with ABFO. According to [the webcast](#) and [public notes](#) from the meeting, chairman Barsley did include the ABFO "decision tree" in his presentation. He also incorrectly compared the uniqueness of bite marks to fingerprints, and noted that while he couldn't point to a citation of a study showing that human dentition is unique, "there are studies that lead us to believe this is true." (In fact, the only peer-reviewed, scientifically rigorous study of the uniqueness of human dentition has been conducted by Peter and Mary Bush's team, and they've found no basis for that assertion.) Curiously missing from Barsley's presentation was any discussion of the ABFO study showing that the decision tree failed to produce a consensus among even the ABFO's most experienced analysts.

As the ABFO hems and haws on this study and takes another year to redesign it, ostensibly to achieve more favorable results, bite mark evidence continues to be used in criminal cases, and existing bite mark cases continue to move forward. Over the last several months there have been new filings in the death penalty cases of Eddie Lee Howard in Mississippi, and Jimmie Duncan in Louisiana. At least 15 people convicted with bite mark evidence are currently awaiting execution.

Meanwhile, just last week a sheriff in northern Indiana announced that he'll be assembling a "forensic dentistry team" within his department. [From the Chicago Tribune:](#)

Sheriff David Reynolds recently swore in three local dentists as part of the department's forensic dentistry team . . .

The dentists will do everything from matching bite marks with suspects or victims, to using dental records to identify victim's remains, Reynolds said . . .

Over the years, Reynolds has used forensic dentists a number of ways.

"We used them for rape cases, investigating bite marks," he said, as well as for remains . . .

"There were other cases where people were bitten and we were able to take (dental) models and pictures and match them up to bite marks on the victims."

So even as we await the results of the ABFO's do-over on its own study to assess the validity of this field, not only do those convicted due to bite mark analysis remain in prison, law enforcement groups are still using it to win convictions. It's almost as if those 24 exonerations never happened.

(**Forensic odontology* or forensic dentistry, includes the controversial field of bite mark matching, but also the more accepted practice of using dental records to identify human remains.)

(**Senn did not respond to my request for comment. In an email, Pretty acknowledged the study, the results, and that the ABFO will be conducting another study to be published next year. But because the study was administered by the ABFO, using ABFO case studies, he wrote that "it would be wrong of me to make any comments on the work beyond those that were made at the AAFS.")

