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## **SBI relies on bullet analysis that critics deride as unreliable**

Last of four parts

Beth Desmond looked through a microscope at two mangled bullets.

It was the start of a 2006 murder trial in Pitt County, and prosecutors needed her help to fix a potentially crippling weakness in their case. They asked Desmond, an SBI firearms analyst, to determine whether the two bullet fragments had passed through the same gun, a Hi-Point 9 mm she had already linked to a cluster of casings at the crime scene.

Desmond's answer was quick, sure and pleasing to the prosecution. But her work in the case has threatened the integrity of yet another unit of the State Bureau of Investigation.

A News & Observer investigation of the SBI has revealed more than a dozen instances in which agents cheated or bent the rules to secure an answer prosecutors sought. At the crime lab, examiners have bypassed accepted techniques, despite pushback in the wider scientific community. Even when their bosses learn of missteps, they often do nothing.

Attorney General Roy Cooper has asked his new director, Greg McLeod, to review the work of the firearms identification unit, citing concerns raised by The N&O this summer. Cooper, a Democrat, removed previous director Robin Pendergraft, who in an N&O interview struggled to explain flawed lab work.

With Desmond's Pitt County assignment, the stakes were high. A 10-year-old boy had caught a bullet during a street fight between two groups of rival teens. His death rocked the small town of Ayden. Her analysis would make or break the case against Jemaul Green, the man they believed accidentally killed Christopher Foggs.

Desmond would turn to firearms and toolmark identification, one of the oldest and most controversial disciplines of forensic science, to harness these clues into proof that Green was the only gunman. Green had insisted from the start that another man had fired first and that he shot back in self defense. The gun -- or guns -- had vanished, leaving only a smattering of casings and bullet fragments.

Desmond examined a bullet found in the eaves of a nearby house; the other was collected from the yard near where Christopher collapsed.

The day after getting the request from prosecutors, she testified that she was absolutely certain both bullets were fired from a Hi-Point 9 mm Model C handgun, the same type she had matched to casings scattered about the ground where Green stood that day. Her report eliminated doubt about another shooter.

But what Desmond actually saw when she looked at the bullets through a microscope that day in 2006 is a mystery and a growing controversy. Desmond took no photographs. She scribbled down the measurements of the lands and grooves - the raised portions between the lands - on each bullet.

Desmond's examination gnawed at David Sutton, a Greenville lawyer who represented Green's girlfriend in charges stemming from Christopher's death.

Sutton wanted to see what Desmond saw. This spring, Sutton asked a former FBI crime lab analyst to photograph the bullets under a microscope.

Butt to butt, amplified seven times, the bullets look starkly different.

Independent firearms experts who have studied the photographs question whether Desmond knows anything about the discipline. Worse, some suspect she falsified the evidence to offer prosecutors the answer they wanted. They said it is vital that the bullets be examined independently under a microscope.

"This is a big red flag for the whole unit," said William Tobin, former chief metallurgist for the FBI, who has testified about potential problems in firearms analysis. "This is as bad as it can be. It raises the question of whether she did an analysis at all."

In an interview, Desmond said she is absolutely confident of her findings and that the photos don't reflect what she saw under the microscope when she examined them in 2006.

"I take great offense to the fact that someone [is] saying I did something that was not straightforward or accusing me of anything," Desmond said. "I am very proud of my work."

Green has spent four years locked away in state prison for a crime he says he didn't commit. The possibility that an SBI agent's faulty work may have put him there with a 23-year sentence is more than he can fathom.

"It's one thing to make a mistake," Green, 24, said during an interview at Eastern Correctional Institution in Maury. "What dog do they have in this fight? They don't even know me."

## Shaky science

As forensic science goes, firearm and toolmark analysis stands on shaky legs. It's built on the idea that every tool leaves a unique mark.

Unlike with DNA, there is no statistical foundation. Experts, therefore, can't provide probability of error. Every bullet identification boils down to a subjective evaluation by an analyst.

"The scientific knowledge base for toolmark and firearm analysis is fairly limited," according to a landmark study issued last year by the National Academies, the nation's leading advisory group on science, medicine and engineering.

In recent years, judges in some federal courts and a military court have forbidden analysts to draw such strong conclusions about firearms analysis, saying the science isn't strong enough. One federal judge has ruled that without photographs of the bullets, he won't allow any testimony.

Some labs have adopted policies forbidding analysts from performing comparisons between bullets or casings when the gun hasn't been recovered, experts say. Every bullet fired from the same make and model will have the same number of lands and grooves. Experts say they can use smaller markings on a bullet to pinpoint a particular gun.

The use of those finer markings can be inexact, too. One study suggests that up to 20 percent of guns of the same model produce identical markings on fired bullets. In other words, assuring a jury of a match is risky.

"Alarm bells are going off in our associations," said Liam Hendrikse, an independent firearms analyst in Toronto. "The chances of a gun not matching a bullet recovered from the crime scene when it involves an American gun is highly likely. Our days of speaking with such certainty should be over."

The SBI's job description underscores the ambiguity of firearms analysis. The description says the analyst must "solve unknowns for which no set procedures are in place."

Yet firearms analysts such as Desmond often testify with absolute certainty.

## SBI undeterred

SBI examiners have not been deterred by the national pushback. They draw conclusions about bullets collected in uncertain situations, records show.

Jerry Richardson, head of the crime laboratory, expressed confidence in firearms and toolmark analysis, saying it was based on sound research.

"Firearms is one that is pretty much an exact science," Richardson said in an interview. Desmond, too, said she has great faith in the accuracy of firearms identification.

SBI examiners routinely match bullets to a single gun even when the gun is missing. They have analyzed rusted guns fished out of rivers and test-fired bullets to draw a match with those recovered at a crime scene. They have used corroded bullets pulled from victims' bodies to make comparisons.

The SBI lab has chosen not to purchase cameras for their microscopes to record the images analysts see. "I just feel that pictures are not truly representative of what we do," Desmond said in an interview. She said that she had the advantage of viewing the bullets under a microscope, not just in a photograph.

Richardson said the bureau is considering getting cameras. At several thousand dollars each, they would cost much less than other equipment in the lab.

Analysts such as Desmond ask the court for its trust, saying they reached their conclusions because of training and experience.

At the SBI lab, training is often minimal. In July, a judge in Wilson County forbade analyst Ron Bakis from being qualified as an expert during a murder trial after a defense attorney argued he wasn't experienced enough. Two days later, the judge also blocked testimony from his supervisor after questioning the supervisor's knowledge of the case.

Bakis, who has an economics degree and no science background, testified during the July hearing that he is still in training as a firearms examiner, according to a transcript. Bakis told the judge that his training had consisted of studying a manual at his own pace over two years. Visiting a gun manufacturer is part of the training; Bakis said his trip to a manufacturer was scheduled for later.

The accused man was acquitted last month.

When Desmond, 45, testified in 2006, she was a novice examiner. And she had come to the field through a peculiar route.

She had been an accomplished ballerina, so distinguished that she earned a degree at the prestigious Juilliard School in New York City in 1986. She traveled the world with a dance company for nearly a decade before heading back to school in 1995 to earn a degree in forensic science at John Jay College of Criminal Justice in New York.

She worked for a county crime lab before taking a job with the SBI in 2002, according to her résumé.

For two years, she worked under veteran toolmark and firearm examiners at the SBI. In April 2005, she had performed well enough on proficiency exams and moot court evaluations to begin comparing guns and projectiles on her own.

That was little more than a year before she was asked to make sense of a bunch of bullets and casings from Ayden.

### Certainty in court

Desmond reported to Pitt County Superior Court twice more in related cases after Jemaul Green's trial to deliver her analysis about the Ayden shooting. Each time, she spoke with certainty, even as defense counsel tried to bar her from testifying.

Desmond spoke more surely in the witness box than she did in her lab reports.

Desmond had hedged in her lab report on the bullets, saying that the bullets were "consistent" with those fired from a Hi-Point 9 mm Model C handgun. In her report, she advised prosecutors to not rule out any other type of gun should police recover the weapon used that day. A supervisor in the firearms unit signed off on her written reports.

In court, however, Desmond concluded with "absolute certainty" that they were fired from the same kind of gun. Desmond said this month that she meant to say she was absolutely certain that the bullets were consistent with a Hi-Point 9 mm.

To make either determination, Desmond had to conclude that the bullets had the same number of lands and grooves, a series of depressions and flat surfaces created when a bullet is gripped and propelled through a gun's barrel.

When a bullet is mangled, like the ones found in the Pitt County case, Desmond is forced to measure a single land and groove. She then plugs those measurements into a formula to determine the total number of lands and grooves, according to the SBI manual.

It's one of the most basic steps in firearms analysis, and it must be done before all others. If the number of lands and grooves on the bullets being compared is different, examiners figure they can't be fired from the same gun.

It is Desmond's measurements that befuddle independent analysts asked to evaluate the photographs of the two bullets. She determined the two bullets had the same number of lands and grooves. The independent analysts say the widths of the lands and grooves on

the two bullets are starkly different, which would make it impossible to have the same number.

"You don't even need to measure to see this doesn't add up," said Hendrikse, the firearms analyst from Toronto. "It's so basic to our work. The only benefit I can extend is that she accidentally measured the same bullet twice."

Desmond said that the other analysts must be confused about where the lands and grooves are on the bullets.

A fight, a child killed

Christopher Foggs had been visiting relatives when a fight broke out between two rival groups of young women.

They fussed and cussed and stepped into the street, inviting their foes to a fight. Jemaul Green dated one of the women, Vonzeil Adams; he said that he had been asked to drive her and several friends to Sixth Street in Ayden, where the other girls loitered.

Soon, the words faded behind a clatter of gunshots. Green said he fired after a slim man hidden in the shadows between two houses shot in his direction. Green returned fire, saying he shot into the air to warn the other shooter that he, too, was armed.

As the shots rang out, Christopher ran from a neighbor's porch back to his relative's house. A bullet punched through the front left corner of his chest, piercing his heart before it exited from his upper back.

Christopher's brother, Taybron Raheem, rushed closer to cradle him as he gasped for air, said District Attorney Clark Everett. Less than 10 minutes later, Raheem stood in Adams' house, pointing a gun at her and saying she would pay for his brother's life, according to police reports.

Green is convinced it was Raheem, shooting from the other side of the road, who accidentally shot Christopher during the melee.

Raheem could not be found for comment. Esther Bruce Taft, mother of Christopher and Raheem, denied that her oldest son was even there the day Christopher died.

The jury that convicted Green of second-degree murder never heard about Raheem and his visit to Adams' house. Superior Court Judge Clifton Everett blocked attempts to introduce evidence that Raheem could have been a second shooter.

Desmond had convinced the judge: Nothing but bullets and casings from a Hi-Point 9 mm Model C had been recovered there.

'Monkey business'

David Sutton, the Greenville lawyer, often ruffles the feathers of judges and prosecutors. He says he cannot let the matter go.

This spring, at the trial for Adams, Green's girlfriend, Sutton tried to block Desmond's testimony. He had flown in an expert from New York ready to testify that Desmond shouldn't be so certain about the bullets matching because of the fallibility of firearms analysis.

At every turn, Sutton failed. Everett, the judge, called Sutton's efforts "monkey business." Judge Everett ordered that Sutton's expert could not testify before the jury.

Still, Desmond's analysis bothered Sutton.

"They want you to trust them because they work for the SBI," said Sutton. "I'll trust them when I see that the evidence actually shows what they say it does."

As Adams' trial wound to an end, Sutton called a colleague: Fred Whitehurst, a Pitt County lawyer who formerly worked at the FBI's crime lab. Whitehurst had a microscope and a camera at home and promised to bring them to court.

After all the evidence had been submitted, the judge allowed Whitehurst to put his equipment to use. A prosecutor and a court clerk followed Whitehurst into a private room and watched him set up his microscope.

Whitehurst took a look, shook his head, then looked again.

"It didn't take a lot of analysis to see there was something really off here," Whitehurst said.

Sutton filed a motion asking for a mistrial based on the new information. It was denied.

Adams was also sent to prison. Her crime was built on his: aiding and abetting manslaughter. The jury concluded she had lured a killer into Christopher's path that day.

SBI: No second look

Whitehurst called Richardson at the crime lab in July to alert him of his concerns. Desmond said the SBI declined Whitehurst's request to analyze the bullets again.

"We said no because we're confident in our work," Desmond said.

Sutton asked for permission to send the bullets away for independent testing. District Attorney Clark Everett consented, but the bullets have not yet been sent.

"If there's a problem and we have another shooter out there, we want to know," Everett said.

Everett has been here before. The SBI botched a capital case he prosecuted in 2007 against Leslie Lincoln. An analyst in the DNA section swapped the samples from the victim and the suspect and erroneously concluded a bloodstain at the crime scene belonged to the suspect.

Everett lost that case, and he has since tried to maintain his confidence in the work of the SBI.

"Mistakes get made, and we'll do our best to correct it. I'd hope the SBI would see that, too," Everett said. "If they don't, we have a major problem."

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