The 27-Year-Old Cold Case That Will Put Familial DNA on Trial

Critics of the justice system's reliance on familial DNA are looking to the trial of a Maine man, accused of a horrific crime, as a case that could change the status quo — with repercussions outside the courtroom.



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By Kathryn Miles
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It's a case that has made national headlines not once but twice. First, in 1993, when a young woman from a remote Native Alaskan community was found brutally murdered in a residence hall at the University of Alaska Fairbanks. Then again last year, when Mainer Steven Downs was arrested in his hometown of Auburn for the crime.

In the 26 years in between, despite emotional vigils and protests held on each anniversary of Sophie Sergie's death, the case had grown cold. And detectives in both Alaska and Maine agree it may

have remained so if not for advances in genealogical genetic testing and law enforcement's increasing use of DNA databases from consumer ancestry websites, like the one California police used to make their high-profile arrest of the Golden State Killer in 2018.

But unlike in that case and others, the paucity of evidence in the Sergie murder, and the fact that it seems likely to go to trial, has some legal observers predicting that the Downs case may be the first real test of the limits of DNA forensics in criminal prosecutions — that this case may even reach the U.S. Supreme Court. And the decisions handed down along the way could have implications that affect all Americans.

"What the courts say about this case will impact literally all of us — not just the millions of people who have pursued their family ancestry through DNA, but also the hundreds of millions of relatives who can be identified through that DNA," says Natalie Ram, a constitutional scholar and law professor at the University of Maryland. "This is not just about Steven Downs's expectation of privacy. It's about everyone else's too."

A first-generation college student, Sophie Sergie was born and raised in a tiny village called Pitkas Point, on the lower Yukon River, a region largely inhabited by Alaska's indigenous Yupik people. She enrolled at the University of Alaska on scholarships, intending to major in oceanography. When money ran low her sophomore year, she took a leave of absence from the university, but she returned to Fairbanks in the spring of 1993 for a scheduled orthodontist visit. Sergie spent two days on campus, bunking with a friend. A little after midnight on April 26, she left her friend's dorm room to smoke a cigarette. Some 14 hours later, her body was discovered in a bathtub by janitors cleaning one of the dorm's shared bathrooms. Her pants and underwear were lowered and her sweater and bra lifted. In addition to several stab wounds, investigators found a single bullet wound in the back of her head, eventually determined to be her cause of death.

During an autopsy, examiners collected biological evidence, including an indeterminate number of spermatozoa taken by swab. But at the time of Sergie's murder, the science of DNA forensics was in its infancy. It would be another two years before the trial of O.J. Simpson drew national attention to the role of DNA evidence — and to potential flaws in its collection and handling — and decades more before databases and advances in testing allowed for the sophisticated analysis practiced today.

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Over the years, detectives pursued multiple leads in the case but determined all were dead ends. Then, in 2017, retired Alaska State Trooper Randy McPherron was assigned the case as part of the state’s Cold Case Investigative Unit. McPherron had been studying case files for months when news broke that the infamous Golden State Killer had been identified and apprehended thanks to familial DNA analysis. He contacted Parabon NanoLabs, a for-profit DNA technology company. Parabon’s genetic genealogy division is managed by CeCe Moore, known for her work on several high-profile criminal cases, as well as her appearances on popular television shows like PBS’s *Finding Your Roots*. Moore was intrigued by the case and decided to work on it personally.

Moore began her career helping adoptees locate their birth parents, and she says the process for identifying a criminal suspect is remarkably similar. Most at-home DNA tests — the sort you might buy online, then mail in to learn about your family history — ask consumers either to spit into a vial or to swab the inside of their cheeks. A company like 23andMe or Ancestry.com then teases out the consumer’s DNA and maps hundreds of thousands of positions within that individual’s DNA code, drawing conclusions about ancestry by algorithmically identifying patterns, then matching these to patterns identified in their huge libraries of other samples. Consumers can use their genetic information to search for ancestors and relatives, either in the company’s proprietary database or by posting their DNA

information to third-party sites with publicly searchable databases — the most popular of these is called GEDmatch. Based on the number of identical positions between any two samples, genealogists like Moore can determine the immediacy of a relationship, from parent-child to distant cousin. By building elaborate family trees, they can also refine a search for individuals of a certain age, sex, or even race or ethnicity.



Five months after McPherron contacted Moore, she reported back: DNA from the spermatozoa taken from Sergie's body bore a distinct resemblance to DNA submitted to an ancestry site by a woman living in Vermont. Traditional genealogical research revealed that among the woman's relatives was a nephew, Steven Downs, who, in 1993, had lived in the same residential tower where Sergie's body was found. Born and raised in Auburn, Downs had left Maine in 1992 to major in English at the University of Alaska Fairbanks.

It's unclear whether Downs was ever questioned during the initial inquiry into Sergie's death. In 2009, investigators interviewed his college girlfriend, who recalled that Downs and several friends were watching movies together at the time of the murder. (Last year, during grand jury testimony, she qualified this, saying she couldn't remember many specifics of the evening.) In 2010, police questioned Downs's first-year roommate, a campus security guard at the time of the murder who allegedly assisted in securing the crime scene. According to court documents, the roommate told investigators that Downs had owned a handgun of the same caliber as a bullet recovered from the scene. (Downs denies this. His former girlfriend and other friends told investigators they'd never seen him with a gun, but the girlfriend later told a grand jury that he had one. Court documents indicate the roommate was later dismissed from campus security for possessing a firearm of his own, violating campus rules.)

Before Maine State Police approached Downs in February 2019, his only criminal record was an OUI received shortly after completing his undergraduate degree. In the years since, he'd earned an MBA and a nursing degree and moved back to Auburn. He was between nursing jobs and living not far from his childhood home when police brought him in for questioning and requested a cheek swab. (Defense motions indicate they first, unsuccessfully, tried to obtain DNA by searching his trash and by tailing him in hopes of collecting a discarded cup or tissue.) A few days later, the Maine State Police crime lab determined his DNA matched the spermatozoa found during Sergie's autopsy. Downs was taken into custody and, in June of last year, extradited to Alaska, where he remains imprisoned awaiting trial.

Downs's defense team comprises one Alaskan attorney and two from Maine: Jesse James Ian Archer, of Auburn, and former two-term Lewiston mayor James Howaniec. Last year, Howaniec made Maine headlines when he publicly, if briefly, mulled a run for the Democratic nomination in the Senate race against Susan Collins, telling reporters his role in the Downs case was one factor holding him back.



Steven Downs, right leaves the courtroom with his attorney, James Howaniec. Photo by Russ Dillingham/Sun Journal via the Associated Press.

The team has filed multiple motions arguing that no evidence links Downs to Sergie's death: No witnesses place him at the scene. Police have established no motive for his involvement, and no other forensic evidence implicates him, including fingerprints taken from the bathtub and tub-room door. Male DNA found on Sergie's breast couldn't be matched to the DNA of the spermatozoa, nor could hair samples, including pubic hair, found on her body and clothes. Defense materials point to a medical examiner's report stating no evidence of sexual assault was found, and they note that even McPherron, in his application for an arrest warrant, acknowledged that the presence of Downs's sperm doesn't prove he either sexually assaulted or murdered Sergie. As legal scholars have pointed out, the presence of sperm on a victim could indicate that consensual sex occurred in the days leading up to the crime. So-called "trace evidence" or "touch DNA," including spermatozoa, has also been spread through washing machines, bathtubs and showers, lockers, and other shared appliances and spaces — one reason why the amount of evidence collected and the specific location of its collection has become increasingly important in legal cases.

The defense has also raised issues with the integrity of the investigation, arguing that police failed to secure the crime scene before evidence could be collected and that Alaska's state lab retroactively made corrections to its early reports — in some cases, years later.

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Written motions from the defense team also implicate the methodology used to identify suspects by companies such as Parabon NanoLabs, pointing to a lack of oversight and peer review for genetic genealogical research and to the unknowability of error rates. They cite a lack of accreditation standards for the labs conducting consumer DNA analysis and the refusal of software companies to release information about the programs they sell to law enforcement for DNA analysis.

In nearly 200 pages of pretrial motions, the defense elaborates on these and several other objections, which the court will address in pre-trial hearings scheduled to begin at the end of September. But at the heart of their arguments is a simple idea: that despite the popular notion of DNA evidence as ironclad, genetic material linked to suspects via familial DNA searching is too fraught to be the sole basis for a trial and conviction. If the court agrees, it may represent a powerful legal rebuke to an increasingly common investigative tool.

CeCe Moore is the first to say she wants limits on how genetic genealogy is used in criminal cases. Moore is quick to point out that, to her knowledge, no one has been arrested based on ancestry DNA alone — that is, without a current sample from a suspect being obtained. She'd like it to stay that way.

"What we provide is a highly scientific tip, but it's still just a tip," Moore says. "We're really just identifying the source of DNA, not determining someone's guilt or innocence. It's up to investigators and attorneys to confirm our work and build a case around someone."

The way she sees it, companies like Parabon NanoLabs, which has participated in DNA analysis leading to dozens of cold case arrests, exist to help investigators limit their search.

"For every traditional arrest, dozens and dozens of individual people are pulled into an investigation," she says "We can narrow that down to a much smaller range of people."

A recent Baylor University study found that 78 percent of survey respondents support that kind of work to solve violent crimes — the figure drops to 39 percent for nonviolent crimes. But some civil rights advocates argue that public support doesn't mean the practice should continue.

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"What we're talking about is an investigative method that builds enormous family trees based on our most sensitive and private genetic traits," says Vera Eidelman, a staff attorney for the American Civil Liberties Union's Speech, Privacy, and Technology Project. "The government is amassing an enormous amount of information about us as individuals. We should all find it deeply troubling that there aren't any kind of guardrails on how they can use this material."

She and others agree that, when it comes to DNA and genetic analysis, there's more at play than just criminal cases. They note that the same DNA tests that suggest where a person's ancestors resided can also reveal pre-existing medical conditions that could, theoretically, be used to deny health insurance or establish higher premiums. The same tests could predict a genetic propensity for violence or chemical abuse, which could be used to deny someone bail, halt adoption proceedings, or prevent pathways to citizenship.

Because the use of genetic genealogy in court cases is so new, there is virtually no legal precedent governing its use, says Ram, of the University of Maryland. And once law enforcement obtains a sample of someone's DNA, she adds, data derived from it may remain at their disposal indefinitely — DNA obtained from sexual assault victims and family members of suspects, for example, has been analyzed and loaded into databases for future use.

Ram and other constitutional scholars also raise legal questions about privacy and consent. When we submit our own DNA to a commercial site, we are also submitting the DNA of our parents and siblings and children and grandchildren, family members who have not agreed to any kind of inquiry that may follow. In early 2019, more than 26 million individuals had submitted DNA to these commercial sites. Experts say that if submission trends continue, that number could surpass 100 million by next year. At that point, Ram says, it will be mathematically possible for authorities searching such sites to identify a relative of every human in America.

"We wouldn't think it was okay for the police to search every single house in our town, so why is it okay to search all of our DNA?" asks University of Maine philosophy and ethics professor Jessica Miller. "Many people, me included, think we've already gone too far."



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In 2005, police linked Dennis Rader, the so-called BTK Killer of Wichita, Kansas, to crime scene DNA by obtaining a pap smear performed on his daughter years earlier. They did so without her consent and with no evidence or insinuation that she was involved in a criminal act. Both the warrant and the test itself, some legal scholars say, violate the Fourth Amendment, which prohibits unreasonable searches and seizures.

As Ram explains, a limitation of the justice system is that it's hard to challenge law enforcement practices outside of an active criminal prosecution. (Rader pled guilty.) That's why she and others are watching developments in the Steven Downs case so closely: how the court responds to the motions filed by his attorneys could establish whether these practices interfere with the rights of privacy or whether they can continue and perhaps proliferate.

A trial date for Downs has not yet been set. The family and friends of Sophie Sergie, who've waited 27 years for some resolution to the case, continue waiting. Meanwhile, commercial DNA-testing companies are scrambling to create best practices for law enforcement use of their data. Some companies say they expressly prohibit any law enforcement use — although in at least two cases, police have obtained warrants compelling those companies to hand over DNA files. Others, like GEDmatch, now require users to opt in to law enforcement searches. Some users accuse companies of setting policies that are deliberately unclear, change without users' knowledge, or are less than transparent about a company's

relationship to law enforcement.

The Downs case, Ram says, could prompt companies to further alter their policies regarding what information they share with law enforcement. But her primary concern remains how the case might impact government's use of citizens' most intimate information.

"If we are all going to have our genetic privacy vindicated and protected, we must have a court find these kinds of uses violate the Fourth Amendment," Ram says. "You may never be a suspect in a violent crime, but that doesn't mean the government can't make your life really difficult."

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