

**OPEN NINTH:  
CONVERSATIONS BEYOND THE COURTROOM  
CRACKING THE CODE  
EPISODE 133  
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HOSTED BY: LISA T. MUNYON**

(Music)

**NARRATOR:** Welcome to another episode of “Open Ninth: Conversations Beyond the Courtroom” in the Ninth Judicial Circuit Court of Florida.

And now here’s your host, Chief Judge Lisa Munyon.

**CHIEF JUDGE MUNYON:** Hello, and welcome to Open Ninth. I’m here today with retired intellectual property attorney turned genetic genealogist Barbara Rae-Venter. Barbara has been involved in solving several high-profile cases but is best known for her work helping investigators identify Joseph James DeAngelo as the Golden State Killer.

The science journal *Nature* named her as one of ten people who mattered most in 2018. And *TIME* magazine included Barbara in their list of the hundred most influential people in 2019. A much sought-after expert in the field, Barbara is a search angel with DNAAdoption.com [sic] helping adoptees find their birth parents and continues to work with law enforcement to help solve difficult cases. We are thrilled to have her here in the studio today.

Thanks for joining me, Barbara.

**BARBARA RAE-VENTER:** Well, thank you for inviting me. This is really kind of fun.

**CHIEF JUDGE MUNYON:** Yes, it is. You have a very varied background. Can you tell me about your education and what led you to where you are today?

**BARBARA RAE-VENTER:** Well, I actually didn’t choose to be where I am today. But, yeah, just to give you a little bit on my background, so I have a -- my bachelor’s degree is actually a double major in psychology and biochemistry. It was a special projects major at the University of California at San Diego. And then -- also then continued on to graduate school at

UC San Diego. And I -- and then a PhD in biology. It was actually biochemistry, but at the time they didn't have a specific degree in biochemistry.

From -- my research was in breast cancer research. I was trying to develop drugs that were specific for breast cancer. And so I then -- for my postdoctoral fellow, I then applied to the breast cancer department at Roswell Park Memorial Institute in Buffalo. And so I was a postdoctoral fellow and then a cancer research scientist at Roswell Park.

**CHIEF JUDGE MUNYON:** Did you want to be a scientist or researcher?

**BARBARA RAE-VENTER:** Yes. So that was my plan at the time. I was -- research is actually kind of like what I'm doing now. It's a real rollercoaster in that when the research is going well, it's really exciting. And of course when it's not going so well, when you're not -- the results aren't coming out quite how you want them, then it can be on the other end of things.

But there -- now -- so it's sort of addictive like doing genetic genealogy is. When you're making breakthroughs, it's just really, really exciting. I remember one of the things that I was doing is I was trying to grow human breast cancer cells in tissue culture. And so another woman and I would go around to the local hospitals in San Diego and we would collect biopsy specimens, and then I would culture them.

And I remember I was sitting in the lab, it was probably 3:00 a.m., and I'm looking through the microscope, checking out my little cultures that I've been doing, and in one of the dishes there was this beautiful little cluster of cells that are growing. It was so exciting. And people had had trouble trying to grow these kinds of cells, so here I am, 3:00 a.m., all by myself, and just feeling just on top of the world.

And so -- and that's kind of like what genetic genealogy is like. You finally put all the pieces together, and suddenly you have the name of the suspect, and you're the only person that knows that until you share it.

**CHIEF JUDGE MUNYON:** That research in breast cancer sounds fascinating. What led you to leave that and to go to law school?

**BARBARA RAE-VENTER:** Well, so from Buffalo, I went -- I had a faculty position at the University of Texas Medical Branch in Galveston. And I had a tenure-track position, and so as part of that you had to be on committees and stuff like that. And so one of the committees I was on was the Admissions Committee for the medical school. And I found myself asking the students that were interviewing -- you know, we want to see if they actually know anything besides what they've been doing in school. You know, are they aware of issues in medicine, for example. And I found a lot of the questions I was asking had to do with medical ethics.

You know, back then, some of the issues were things like frozen embryos. What do you do with the embryos if, you know, the parents divorce or are killed in a train crash or, you know, something happens to the parents? And what was some of the -- oh, surrogacy was just becoming an issue. And of course under most state law surrogacy would have been considered selling of humans, which of course you can't do. So then were all the issues around, well, how can you make surrogacy work. So I just was fascinated by that.

There was also a case that came up. There were two children who both needed a liver transplant, and there was one -- one liver became available. And this was of course all over the news. So there were two little girls and they were equally ill, and whichever one did not get a liver was -- it was -- basically it was they were going to die.

And so the -- one was black, one was white. The white girl, her father was an administrator in a hospital. The black girl had no connections with, you know, any kind of health services. The father of the white girl gave a presentation to the Pediatric Association as to why his daughter should get the liver. And of course you know who ended up getting the liver.

And so one of the questions I posed to the students was, okay, how would you design a better system where it's not a popularity contest. And it was actually surprising how few of them were even aware of this even though it was all over the newspapers. And then, you know, just to sort of think through it as, no, okay, this is a real problem; we have to come up with a better system.

So I found like, you know, I was just interested in a lot of those kinds of topics. So when I went to law school, that was actually what I was planning on doing.

**CHIEF JUDGE MUNYON:** You were planning on doing --

**BARBARA RAE-VENTER:** Medical ethics, yeah.

**CHIEF JUDGE MUNYON:** -- teaching in medical ethics?

**BARBARA RAE-VENTER:** Right. Yeah.

**CHIEF JUDGE MUNYON:** Wow. Yeah, I think some of my decisions as a judge are difficult. A decision like deciding which little girl lives and which little girl dies would be very difficult. I honestly can't imagine having to make that decision. But it's good that there are people like you that can teach doctors how to think about things such as that.

Well, you decided not to just deal with medical ethics, but you also specialized, I believe, in patenting of biotechnology as a lawyer to include investigative genealogy. How did that come about?

**BARBARA RAE-VENTER:** So when I was graduating from law school, there was actually a position that came open at Baylor medical school for either an MD or a PhD with a law degree to do medical ethics. And it was exactly what I had wanted to do. And I just decided I really wasn't ready to go back into academia. And when I was applying for jobs, when I -- both when I was in law school and, you know, for once I got through, people would take one look at my resume and they'd go, well, you should be a patent attorney. They'd see all the science there. And it was not something I'd really ever considered.

So I was at the University of Texas law school in Austin, and they actually had a couple of intellectual property courses. So I figured, okay, you know, why don't I check these out, see if I like them. And I actually found it fascinating. And so I then applied for positions as a patent attorney out of law school, and it was -- I mean, this was pure serendipity. This was the very beginning of the biotech era.

And there was me and one other woman with exactly the same background as I had who were both applying at the same time. Basically anywhere we applied for a job, we got incredible offers. And of course up until that point, the people who were trying to work on biotech patent applications and also the patent examiners were all chemists. And chemists and biologists really don't think quite the same way.

When you think about something that's new and spiffy in chemistry, you're talking about new molecules, so you're looking at structure and how to synthesize a new compound. If you're a biologist, what you're interested in is the function of the molecule. What is it going to do? How can you make something as close as possible to what exists in nature but is better? And so it's subtly a different way of thinking about it.

And I remember when I -- the person that I ended up working with was a guy called Bert Rowland, who had done the original biotech patent application. It was an application for Stanford and University of California. And this was the original genetic engineering patent application.

And so when I was first working with that, you know, I'd write some claims for him and he'd go, well, you know, that's not quite how I would write them. Of course, his PhD was in chemistry. And yet he could see where I was coming from because I was, you know, focusing on the function of the molecules. Were they doing what we wanted them to do? Were they giving us something that you didn't have when you isolated, for example, Factor VIII, from blood; what happened? Well, of course, back then you didn't have any way of excluding stuff like viruses. And so potentially when you isolated stuff from blood, you were -- of course, what we ended up with was things like HIV and other things contaminating the Factor VIII products.

Well, if you made the Factor VIII using genetic engineering, you didn't have that problem. And so you had the same molecule, but it was free of viruses that were going to potentially affect people who were taking the Factor VIII. So suddenly you had a whole different compound even though it was theoretically the same. So from a chemical standpoint, yeah, you had the same composition. But from a biological standpoint, very different.

**CHIEF JUDGE MUNYON:** Wow. So what led you down the genetic genealogy path from basically this research and patenting path?

**BARBARA RAE-VENTER:** So I retired from being a patent attorney in 2005. And so at that point my plan was to do some traveling, to work on my tennis game, and sort of basically kick back. As I'm sure you know, in the legal profession you work very long hours.

**CHIEF JUDGE MUNYON:** Yeah.

**BARBARA RAE-VENTER:** So I started working on my own family history. And my family history is a little tangled to work with in terms of paper records. And so when I -- so this was back in 2005, and it was just the beginning of when direct consumer testing became available. So the first tests that became available were Y-DNA, which of course only men have a Y chromosome. It traces the direct male line. And so if you've got a Y chromosome, you can look at your direct male line going back actually many, many, many, many generations.

And then the counterpart was mitochondrial DNA. So women pass mitochondrial DNA on to all their children, but only the female children pass it on to the next generation. And so it's sort of the equivalent of the Y-DNA. It allows you to trace your direct maternal line.

And so up until that point -- so this is now around 2007, 2008, that these tests are becoming available. Then around 2009, a new test became available, and this was autosomal DNA, so this is all of your DNA. This is all 22 chromosomes, and additionally they also look at the X chromosome. So of course women have two X chromosomes, men have one. And so it -- that actually adds some interesting capabilities to what you can do. But the big thing is that you can now look at all of your ancestors, not just your maternal line, not just your paternal line. And so this was huge.

And so I'm originally from New Zealand, and on my paternal grandmother's side, all of those ancestors it turns out had come indirectly from Scotland via Nova Scotia to New Zealand. And the paper records were pretty meager. And so it was a new way for me to try and connect the dots back from New Zealand to Canada -- to Nova Scotia to -- and then back to Scotland. And so that was sort of what I started doing.

Well, what I -- what started happening is I would get matches with people who were adopted. And I had no idea how to help them. Because they -- you know, they're trying to find

out who their biological relatives are and, you know, ultimately to identify their birth mother, birth father, or sometimes even a grandparent. So I took an online class with DNAAdoption.org, and from them learned how to do genetic genealogy. And of course when they learned that I had a science background, they were really excited and they asked me to help with teaching their classes.

So -- and I also was answering the webmail that came in since I had a better knowledge of the new DNA testing than most of the other folks did. And so there was an email that came in -- this is now back in March of 2015 -- from a Deputy Peter Headley in the San Bernardino Sheriff's Department Crimes Against Children Detail. And what he wanted to know was there was a woman whose case he was working on, she had been abducted as an infant, and she's now in her 30s, no idea who she is or where she's from.

And so what he wanted to know was the technique that we were teaching to adoptees to help them find their birth relatives, could that technique be used to identify who this woman was, you know, find out who, in fact, her parents were. And so I said, well, yeah, the technique should work. And so I volunteered to work on that.

And that case -- as a lot of these cases do -- it had lots of twists and turns to it. So I was able to identify who her mother was, and I had come up with five guys who were brothers as options for who her father was. So it turned out that -- so the -- her mother was a woman called Denise Beaudin, and she was from Manchester, New Hampshire. So it turned out that Denise's father is still alive, so this is now -- so the woman who was abducted, she was going by the name Lisa. And so that meant that -- so this is now then Lisa's grandfather.

So since I was -- you know, I had five brothers who were options for the father, we asked the grandfather, so now who is Lisa's father. And he says Bob Evans. Well, Bob Evans was not one of the names that I'd come up with, so that was obviously not correct.

So the deputy in San Bernardino on a hunch sent him a picture of the guy who had abducted Lisa. And so he says, yes, that's Bob Evans. So suddenly we knew how this turkey had gotten ahold of Lisa. He was her mother's live-in boyfriend. Well, he -- she'd [sic] gone to prison in California. He had murdered his common-law wife, a woman called Eunsoon Jun, up in Contra Costa County up in Northern California. And there were some similarities in the M.O. between that murder and the murder of four people in Allenstown, New Hampshire. And Allenstown, New Hampshire, is about 20 minutes from Manchester, New Hampshire, where the turkey was living with Lisa's mother.

So the New Hampshire State Police started taking a close look at this guy and ultimately concluded that he actually was the murderer of the people in Allenstown. So of course this was kind of an interesting end to, you know, doing an unknown parentage search, identifying who somebody's parents are. And so there was a fair amount of press on it.

And somewhere along the line, Paul Holes, up in Contra Costa County, learned that I had identified Lisa with just her DNA. We hadn't known anything else about her. And so he gave me a call and asked if I'd be willing to work on one of his cold cases and try to identify a suspect. And so I said sure. And so that's sort of how I got started into doing cold cases, was -- and of course the case turned out to be the Golden State Killer.

**CHIEF JUDGE MUNYON:** It sounds as if the investigative genetic genealogy is using DNA to find someone's lineage as opposed to using, you know, the paper records that people have been using for decades.

**BARBARA RAE-VENTER:** Well, it's actually a combination of both. So the genetic -- I mean, we call it genetic genealogy just because, yeah, we're using actually the same techniques that you would use for doing family history research. So we're still using things like census records, obituaries, you know, whatever we can -- both death and marriage records, whatever we can find online. But we're then adding to that the DNA component, and so we're looking for people who all share some ancestry.

And so what we then do is we've got, say, you know, three people that are all matching each other on -- with their DNA and they're matching to our unknown person, if there's unidentified human remains or whether it's a suspect or, of course in the case of Lisa, whether it's the case of somebody who doesn't know who she is.

And so what you're then trying to do is you're trying to figure out, okay, who are the common ancestors. Because they're all sharing DNA, if they -- if there's a common ancestor for the people that had known trees and we build out that tree, so we figure out, okay, they're -- say they're second cousins, so they share a set of great-grandparents. So what we then know is that the person who is the unknown must also be a descendant of that set of great-grandparents.

And so once we've identified who the common ancestor is for our folks, we then just build down to the appropriate time period in the tree. So we do what's called a reverse tree. We're now looking for people then who meet the profile of the person we're looking for.

So for the Golden State Killer, as an example, we knew that some of the -- or at least the earliest rapes that we were aware of were in around 1976. So we figured he has to be at least probably about 18 to 20 years old. And so based on that, we figure he's probably born in about, you know, 19 maybe 46, '44 -- excuse me, '56 or '54. It turned out he was actually a little older than that. But that's sort of a starting point.

The rapes took place in Northern California, so we figure, okay, he's probably from Northern California. And so as a first pass, once we had built down from their common ancestors, we're now looking amongst all those folks for people who fit that part of the profile; they're the right age and they have the right geography.

And at that point I was actually able to identify nine men. We were fortunate the -- most of the family was actually in New York, but there was a branch of the family that had migrated to California and so those are the ones we were focusing on.

At that point we then actually did what we called a consensual sample. So we approached somebody that we thought was probably going to be a close relative and asked her if she would do a DNA test. So she did, and she happened to come back as being a second cousin, and she also had an X chromosome match.

And as I mentioned earlier, men only have one X chromosome. And so if you've got an X chromosome match, you know that you're talking about a maternal line. It has to be one of his maternal lines that we're looking at. And so at that point, that -- I was then able to eliminate three of the nine men that we had, so we now had a list of six.

One of the other things I had done back at the time, you know, three years ago when we were working on this, there was a utility on the GEDmatch website, which is one of the databases that we were using for looking for relatives to our crime scene person --

**CHIEF JUDGE MUNYON:** Which one was that again? I'm sorry.

**BARBARA RAE-VENTER:** Called GEDmatch. G -- it's --

**CHIEF JUDGE MUNYON:** Oh, yeah, GEDmatch. Yeah.

**BARBARA RAE-VENTER:** Yeah. So they had a utility where you could estimate eye color, and so I had used that utility to determine what was the likely color of a person's eyes, and it came back as blue.

There was actually also another site that was available -- it's now being purchased by another company, but there was another site where you could do the same thing. It was called Promethease. So I also had used that, and it also had come back saying highest likelihood with blue eyes.

So we had our list of six guys, and so the FBI then pulled the California DMV records on them to see what color eyes these six guys had. Only one of them had blue eyes, and that was Joseph DeAngelo. So suddenly we had a name.

**CHIEF JUDGE MUNYON:** With -- for those that don't know about these cases, can you tell us a little bit about the Golden State Killer cases and why law enforcement was interested in using extra resources to solve these cases?

**BARBARA RAE-VENTER:** Sure. So the Golden State Killer, he -- his -- as I said, his first rapes were -- that -- at least that we knew of were about 1976. So we're talking about somebody who has eluded capture for basically around 40 years. He had been responsible for numerous break-ins. His actual beginnings into his crime spree were actually breaking into people's homes.

From there he had escalated to rape, and he was responsible for at least 50 rapes. He was a very sadistic person, and so after raping somebody multiple times he would then -- over the years he would call them back and he would tell them he was going to kill them.

There was one woman in particular, she had actually gotten divorced after the rape, she had remarried, moved. He still tracked her down and 24 years later called her and threatened to

kill her. So he was -- he literally terrorized these women not just by raping them but by constantly reminding them that he knew where they were and he was going to come kill them.

**CHIEF JUDGE MUNYON:** And he did actually kill 26 people, right?

**BARBARA RAE-VENTER:** There were 13.

**CHIEF JUDGE MUNYON:** Thirteen.

**BARBARA RAE-VENTER:** Yeah. So there were 13 murders. So, yeah, at some point he escalated from rape. And he actually also moved where his -- where he was attacking people. There was one murder early on, and then there was another murder. Those were the only two that were actually in Northern California. He then actually moved down to Southern California, so the murders were all around the Los Angeles area. They were a little bit north and a little bit south. And then he suddenly stopped -- or at least appeared to stop.

So there is of course concern that maybe he didn't really stop, he just changed his M.O. but, you know, who knows. So he was both a prolific killer and a prolific rapist. And, you know, as I said, on top of that, you know, that the additional layer of terrorizing people even after the fact.

**CHIEF JUDGE MUNYON:** So the length and the depravity of his criminal history is what led law enforcement to seek you out to apply this relatively new technology.

**BARBARA RAE-VENTER:** Right. Yeah. And Paul Holes who had been the lead investigator on the case, and he'd worked on the case for I believe it was something like 25 years and he was coming up to retire, and so he just really, really wanted to solve this case and so was willing to try something new and different.

And plus on top of that, Anne Marie Schubert, who was the District Attorney in Sacramento, she had actually been fascinated with the possibility of trying to use DNA for quite

some time, and so she had actually put together a task force. And before they had contacted me, they had actually contacted another group that does this kind of stuff to try and get -- so they did a product called Snapshot. And so what they did is they used DNA to try and come up with a picture of the perpetrator. And so they had tried to use Snapshot. They had unfortunately gotten some of the things in it wrong. And in fact Anne Marie has a publication that she did, *Looking for the Green-Eyed Monster*. They had somehow managed to come up with that he had green eyes and they had actually ruled out blue eyes, which was kind of interesting.

I did not see that. So when I was working on it, I was oblivious to the fact that we were looking for somebody with green eyes so -- which is just as well, because I did my own research and decided he had blue so -- which turned out to be correct.

**CHIEF JUDGE MUNYON:** Well, how did this case change your professional life -- your retired professional life?

**BARBARA RAE-VENTER:** Well, yeah, I'm for sure not retired anymore. So -- well of course the minute that the news got out about the Golden State Killer -- I had actually asked to remain anonymous, but I -- the -- so the FBI had said, well, do you mind if we tell people within law enforcement. And I said, no, that's fine, I just don't want it out in the press. And so I started getting phone calls from quite literally all over the country from detectives wanting to solve their favorite cold case.

A lot of them involved children. I think those are the ones that tend to stick in people's craws. They just really want to solve some of these cases that are the more horrendous ones involving children. So I just started getting all kinds of phone calls and emails and just starting working on doing these other cases.

**CHIEF JUDGE MUNYON:** Where do you think this technology is going in the future? Do you see other applications for it?

**BARBARA RAE-VENTER:** Well, the big application of course would be to start using it more for current cases and not just cold cases. I have a couple of cases that I'm working on which are current cases. One of them is a horrendous -- it's a rape of a little girl. She's five years old. The turkey climbed in her bedroom window and raped her. This one is about a year, year-and-a-half old now, so you know he's out there going to do it again and ruin another little girl's life. And so those kind of cases, yeah, I think if we can do -- start moving into doing some real-time cases and stopping these guys before they do further damage would be really good.

There is now a lot of -- there's been a lot of money awarded in the form of grants to various jurisdictions to start working on the backlog of sexual assault kits. We're actually working on a batch of those from one particular county right now. We've got 20 that we're working on. We've solved -- we started working on about three months ago, we've solved seven of them so far, we believe, and we're close on several of the others.

What is of course disconcerting is that amongst these, there are several that are serials. And so I think for those of us working on these cases, these are actually -- because these are live people, these are live victims, they're not dead victims, and we're, you know, sort of up front and personal with looking at these, I think these will probably be more disturbing than some of the other cases we've worked on.

They're -- you're know, they -- again, they've been chosen as being ones that the -- this jurisdiction really, really, really wants to solve. And so they're very brutal. And, you know, it's horrible for these women that they haven't had some kind of closure in the sense that anybody's been brought to justice for this stuff. And that they've, you know, kept on doing what they were

doing because they were fully confident nobody was going to catch up with them is concerning. So I'm hoping that one of the things that will happen as we start publicizing these cases is that we're going to start seeing a chilling effect on some of these guys. Of course they can also be more careful. But on the other hand, it's -- it can be difficult.

We did one case -- this was one I worked on with the FBI -- where the only evidence we had was two hairs. It was another -- it was a rape/homicide of a little girl and there were two hairs discovered on her body. One of them was a male pubic hair, and we were actually able to get enough DNA out of that single male pubic hair to identify who the guy was.

So it's not just a case of, you know, whether they leave semen behind or not. There's other biological evidence that gets left behind as well that people may not really be aware that they're doing. You're shedding skin cells and hair all the time, and so basically, unless the rapist/murderer is wearing a hazmat suit, he's probably going to leave something behind.

**CHIEF JUDGE MUNYON:** Are there obstacles that you foresee that might interfere with the evolution of this technology and its application in the criminal arena?

**BARBARA RAE-VENTER:** Well, the most immediate thing that -- of course that we see is people pushing back saying that it's a violation of privacy. It's sort of like what happened when fingerprints were first introduced. You know, suddenly the fact that you're able to use something that people have inadvertently left behind as a way of identifying them is bothering a lot of people.

A lot of people are bothered by surreptitious DNA collections. You know, once I identify somebody, nobody takes my word for it. The next step is for then law enforcement to go out and do a surreptitious sample on whoever it is I've identified, and from there then compare

that DNA against whatever's in CODIS so that we know that I've got -- come up with the right person. And that's then the basis for a search warrant or an arrest warrant.

**CHIEF JUDGE MUNYON:** For those that don't know, could you tell us what CODIS is?

**BARBARA RAE-VENTER:** Sure. So it's -- it stands for the Combined DNA Index System. And what it is, is it's some -- the -- so this is a different kind of DNA. It's also autosomal DNA but it's -- there are now 20 markers that are being used. There -- they were specifically chosen as markers that -- in the DNA that did not relate to anything biologic, or at least it was believed at the time that they were chosen. And --

**CHIEF JUDGE MUNYON:** This is the type of DNA that is used in criminal trials to identify a biological sample with a suspect, right?

**BARBARA RAE-VENTER:** Correct. And so what happens is -- yes. So when I identify somebody, that's the kind of profile that is then developed and compared against, you know, what is already in the system. And the markers are unique enough that when you identify the correct person, the odds against it being anybody else are typically in the quadrillions. We're talking absolute certainty that it can't be anybody else, of course unless you've got an identical twin.

**CHIEF JUDGE MUNYON:** And CODIS is just a big database that has these 20 generic -- genetic markers from millions of people, right?

**BARBARA RAE-VENTER:** So it's made up of people who are convicted of crimes, and of course it also contains DNA from various crime scenes so you can look for matches amongst the crime scenes. And then that's then of course how you know whether you've got a serial person or not.

The problem is that -- yeah, I'm forgetting how many folks are in that database. I want to say it's like 20 million, but I'm -- that might be the wrong number. And so when you're using CODIS, most -- for most states all you can do is go in and look for an identical match. You can't look around and see if there's maybe somebody who is a close match. You're looking for an identical match. And so even half-siblings are not going to match. If -- so if the half-sibling is in this -- in the database, they're not going to match.

And I actually had a case like that that I was working on. This was the Clearfield Rapist case out of Utah. And so we had identified a family as being the right family, but there was only one son that we could find in the family and he was -- we -- this was a serial rapist, and so they had sketches of the guy. And the driver's license photo did not look anything like the sketch for this one son in this family. So what we decided to do was, okay, let's do CODIS and see, you know, it may -- maybe the sketch is just off. So they ran CODIS and there was no match.

So then what we did is we then did genetic genealogy on it. So we did now the -- what we call a SNP profile and compared that against the now crime scene DNA. Half sibling. And so now we were looking for a half-brother for this person. So this was a bit of a challenge because it turned out that daddy was a long-haul trucker and was kind of --

**CHIEF JUDGE MUNYON:** Many possibilities.

**BARBARA RAE-VENTER:** Well, we lucked out. It turned out -- so there had been -- so one of the things we use a lot in trying to find living people, of course, is we use obituaries. And so we went back through all of our documents, and it turned out that there had been a younger brother who had died when he was like two years old or something, and there was an obituary for him that we found that mentioned a half-sibling that was our guy. And so -- and he also was a long-haul trucker.

So they actually had to wait for him to come back from his truck route, and they did surreptitious DNA on him, and bingo he was our guy. So we got a little bit lucky there. But I was worried that we weren't going to be able to figure this one out.

**CHIEF JUDGE MUNYON:** Are there key things that need to happen to take this technology and the investigative genetic genealogy to the next level?

**BARBARA RAE-VENTER:** Well, we're already seeing them. I mean, even just in the time that I've been doing this, the tools that are being developed are just incredible. So we're actually now able to solve cases that have -- that are -- the matches are more and more distant relatives to our crime scene person just, you know, from using the new tools.

There are tools that -- there's one called What Are The Odds, so you can input your family tree with -- and plug in the amount of matching DNA for the various relatives, and it will tell you where in the tree the highest odds are that your crime scene person belongs. That's huge.

**CHIEF JUDGE MUNYON:** Wow.

**BARBARA RAE-VENTER:** So there are all kinds of new and spiffy things. And there are some new tools that are being developed by the various companies. So, for example, Verogen, the company that purchased the GEDmatch database, they've been developing some basically high-throughput tools which will allow them to take the crime scene DNA and do some slightly different testing on it and then -- basically then plug it straight into GEDmatch and look for people who are matches.

So there are some really super high-tech type things that are becoming available. So I -- and you know -- and of course things are getting smaller and smaller, so some of these things -- some of these tools you can now take out basically on location. So for the Prairie Fire in -- here

in California, there were of course a number of victims of the fire itself. And one of the challenges was in identifying who all these victims were.

And I'm not going to remember the name of the company, but they developed a portable version of their tech -- their analysis unit that folks would actually take out to the field to then analyze the DNA from the bodies that they were finding. And I believe they've identified either all of the victims now or most of the victims now. So that kind of portable technology of course made that kind of a project doable.

**CHIEF JUDGE MUNYON:** Um-hum.

**BARBARA RAE-VENTER:** And of course you see then applications in -- for the military and for, you know, various other folks for being able to do that kind of stuff.

**CHIEF JUDGE MUNYON:** Do you have any concerns about the evolution of the technology?

**BARBARA RAE-VENTER:** I think as long as it's carefully defined what it's being used for. I think it was good that the databases -- so GEDmatch and then the other company that allows forensic samples is FamilyTreeDNA, that they limited use of their databases to violent crimes and unidentified human remains. I think it's important that it is only used for significant crimes. You don't want people, you know, plugging in their neighbor's DNA, you know, to figure out if the neighbor, you know, came on their property or something.

I mean, there -- I've seen some ads -- I guess there's been some stuff that's been developed for canine DNA where you can figure out whose dog pooped on your lawn.

**CHIEF JUDGE MUNYON:** Yeah, I've seen those too.

**BARBARA RAE-VENTER:** But we don't quite want that level of scrutiny for humans. And so I think as long as it's limited in its use, it tends to then negate some of the folks who are

concerned about privacy. Because, yeah, I mean if you're using it for trivial things, I think then you start to -- running into problems with privacy. But as long as it's being -- is -- there is a greater good to this for society, I think that's important.

**CHIEF JUDGE MUNYON:** We saw decades ago how the CODIS type of DNA altered how prosecutors proved cases in court and how law enforcement identified -- positively identified suspects. Do you see those same permanent alterations to law enforcement with this investigative genealogy -- investigative genetic genealogy?

**BARBARA RAE-VENTER:** Well, this is something we don't want going into court, so we've very much been working on trying to keep it being designated as just an investigative tool. So it's basically the same as, you know, the psychic that calls in a hint or -- hopefully I'm more accurate than a psychic -- or, you know, somebody phoning in a hot tip where ultimately there's other testing that is done to determine whether or not this is accurate and that that is then the basis of the search warrant and the arrest warrant.

And so I think it's actually important to keep this out of court because it really doesn't belong there. It's something that -- and I think what it's doing is it's -- when you're getting odds coming back of, you know, whatever, quadrillion to one that it couldn't be anybody else, it does make it a little difficult for a defense attorney then obviously to come up with anything.

What I am hoping to see more of it used for Innocence Project type projects. I think that would be very important. There have been -- already been, you know, several cases where it has been used in that fashion. And I've been a little astonished, actually, reading some of these cases to learn that actually in -- you know, that there was DNA and the DNA actually excluded whoever ended up being incarcerated. You know, there was a confession, for whatever reason, and the DNA was ignored.

So I'm hoping that, you know, we're going to see more use of this tool to -- you know, first of all, it can exonerate the person who's been incarcerated, but it can also identify who the real perpetrator was.

**CHIEF JUDGE MUNYON:** So how do you envision the investigative genetic genealogy being used in something like the Innocence Project?

**BARBARA RAE-VENTER:** Well, again, you --

**CHIEF JUDGE MUNYON:** I would assume it would only work if there were actually DNA that was collected from crime scene from the case where the person was wrongfully convicted.

**BARBARA RAE-VENTER:** Exactly. And that's the crux for all of these cases is you've got to have a source of DNA. I mean, it can be biological fluids, it can be hair, it can be, you know, any of a number of different things. It can be, you know, a smear of blood that was, you know, collected from a doorway. It can be, you know, any of a number of different things, or just biological fluid stains on clothing that can be extracted. So -- but, yeah, you've got to have a source of DNA or you can't do this.

**CHIEF JUDGE MUNYON:** And that DNA would exclude the person because they've convicted someone and if it's the wrong person the DNA would not match.

**BARBARA RAE-VENTER:** And --

**CHIEF JUDGE MUNYON:** But the DNA might lead you to the person that did in fact commit the crime.

**BARBARA RAE-VENTER:** Yeah. So you're actually getting a double-whammy. You're exonerating one person, and then assuming that you can then put the other person at the

scene of wherever that -- the DNA evidence was collected, yeah, you can then identify who the perpetrator really was.

**CHIEF JUDGE MUNYON:** Well, Barbara, I really appreciate you meeting with me today and explaining these very interesting issues and this interesting path that DNA has taken.

Do you see any implication for the courts with what you have done, or do you strictly see this as a tool for law enforcement and then law enforcement needs to follow up and actually put together a solid case based upon some sort of CODIS DNA?

**BARBARA RAE-VENTER:** Yeah. I mean, I -- it's an incredibly powerful tool. You know, most often what we end up with is either a single perpetrator or maybe some brothers. We can usually distinguish amongst cousins if we end up with cousins. But it's incredibly accurate in terms of, you know, actually being able to identify specific individuals, or as I said maybe some brothers. And then of course at that point it's up to the detectives to figure out which brother it is. And, you know, usually they can do that from, you know, an alibi for whichever brother didn't commit it.

And we actually -- we even had a case where we had identical twins. And so -- and that was a case out of Orange County, Los Angeles. And so I guess both twins were arrested, but then one of them was able to show that, yeah, he couldn't possibly have committed the crime.

So I think it's just an incredibly powerful tool, and I hope it gets used properly and gets used more.

**CHIEF JUDGE MUNYON:** Well, you were not terribly successful in retiring the first time. Where do you envision your career going at this point?

**BARBARA RAE-VENTER:** Well, I'm trying to train additional people. So I have, you know, people in my own group plus I also try to train the detectives that I work with because --

and some of them just really take to it. I mean, it's not that different really to what they were already doing working in various databases except you're suddenly working in the Ancestry database instead of TLO or whatever. But a number of my detectives are getting pretty good at this. And I've got one in particular, he actually solves cases before I finish building the tree. He'll recognize names and he'll go, I know it's this woman here, she lives just, you know, wherever in relation to the crime scene, I know it's her. And I said, well, let me build out the tree. And he'll be right.

So it's an interesting, actually, combination -- if you're working closely with the detectives, they often can solve the case just starting to see, you know, who's in it and where they are. So I see more involvement of the detectives as they learn more how to do this kind of stuff.

**CHIEF JUDGE MUNYON:** Well, Dr. Venter, I really appreciate you joining me here today. This has been a fascinating discussion, not just about the Golden State Killer case but about this new application of a technology that's been around for quite some time.

So thank you for joining us. And I hope to hear from you again in the future if you come up with some new and interesting cases.

**BARBARA RAE-VENTER:** I will do that. And thank you for inviting me.

**CHIEF JUDGE MUNYON:** Thank you.

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