

How DNA led to the elusive 'Golden State Killer'

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Detectives in California used DNA left at crime scenes, combined with genetic information from a relative who joined an online genealogy service, to catch an alleged rapist and murderer who eluded authorities for four decades.

The arrest this week of 72-year-old Joseph James DeAngelo—believed

to be the "Golden State Killer" responsible for 12 murders and more than 50 rapes in the 1970s and 1980s—was hailed as a victory for cutting-edge science and old-fashioned detective work.

"The answer was, and always was going to be, in the DNA," said Sacramento County District Attorney Anne Marie Schubert.

Here's how it unfolded.

Crime scene DNA

Schubert opened a cold case investigation into the Golden State Killer two years ago, according to The New York Times.

Investigators started with DNA samples from crime scenes that were in storage to build a genetic profile of the suspected attacker, which they then uploaded into an online genealogy database to see if they could find a match.

A Lake Worth, Florida-based company called GEDMatch acknowledged on Friday that its database "was used to help identify the Golden State Killer... although we were not approached by law enforcement or anyone else about this case or about the DNA."

The company warned customers in a statement that even though the site was intended for genealogical research, possible uses of their DNA include "identification of relatives that have committed crimes or were victims of crimes," and that they should delete their profiles if they had any concerns.

Although DeAngelo himself had not sent his own DNA to GEDMatch, at least one distant relative of his had done so, and possibly more.

GEDMatch is a website that "pools raw genetic profiles that people share publicly," Paul Holes, a retired district attorney inspector, told the East Bay Times.

"No court order was needed to access that site's large database of genetic blueprints."

Larger companies including Ancestry.com and 23andMe denied any link to the investigation and said they had not given any customer data to law enforcement officials.

Online family trees

People who are related share chunks of identical DNA, which is interspersed with sections of different DNA.

Identifying these shared patterns can point investigators to people who are distant or close kin, depending on the extent of the match.

The crime lab began exploring online family trees that appeared to mirror the suspect's DNA profile.

Then, they hunted for clues about various individuals in those families, to see if they were possible suspects.

On April 19, detectives decided that DeAngelo might be the one because a number of factors aligned: the DNA, his age, and the fact that he lived in the area where the crimes occurred.

Investigators set up surveillance in the tree-lined suburb where DeAngelo lived.

Then, Schubert said, "abandoned" DNA samples were acquired from

him.

Officials have not said what was used, but it could have been a soda can, a hairbrush, or anything containing DeAngelo's saliva, hair or blood.

"You leave your DNA in a place that is a public domain," she said.

This allowed experts to compare the newly collected sample to the old DNA from the [crime](#) scene, and it was a match to more than 10 of the murders.

The sample provided "overwhelming evidence that it was him," Schubert said, according to the Sacramento Bee.

'Astronomical evidence'

Schubert asked the sheriff's office to collect a second sample, to be sure. So they did.

"The second sample was astronomical evidence that it was him," she said.

DeAngelo was arrested outside his home Tuesday and charged with murdering two people in 1978 in Rancho Cordova, California.

He is expected to face more charges.

"This was a true convergence of emerging technology and dogged determination by detectives," Sacramento County Sheriff Scott Jones said.

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