F4 The Theory of Criminal Relativity: Using Genealogy Databases to Solve Crimes

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Learning Overview: After attending this presentation, attendees will have a deeper understanding of how genealogy DNA databases are being used to solve crimes and the technical, legal, and ethical issues involved.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by giving attendees the ability to understand how genealogy DNA databases are being used to solve crimes and the technical, legal, and ethical issues involved.

In 2018, using DNA-based genealogical research, police were able to arrest a former police officer who allegedly committed at least 12 murders, more than 50 rapes, and over 100 burglaries in California between 1974 and 1986. In numerous cases after the arrest of the suspect in the "Golden State Killer," law enforcement investigators are now using genealogical databases in a different and much more effective way than previously available methods have allowed. The use of DNA Single Nucleotide Polymorphism (SNP) profiling has significantly changed the face of genealogic searching and those changes now offer new investigative methods of crime solving. Initially, DNA typing methods revolutionized the criminal justice system and led to the development of the Combined DNA Index System (CODIS) database of persons who had contact with the criminal justice system (prisoners, convicts and, in some states, arrestees). Subsequently the ability to extract DNA from ever-more-minute crime scene samples amplified its use in criminal investigations. Short Tandem Repeat (STR) -based familial searching made it possible to search CODIS at the state level—to search not just for perfect matches to crime scene evidence, but also for very close matches to possibly identify close (first-degree) relatives of the donor of a crime scene specimen.

Now, new DNA-based public genealogy databases can be searched for even more distant relatives of whoever leaves crime scene DNA evidence, regardless of whether their profile is in CODIS. Several new open-access genealogy databases now enable law enforcement to search for scores of even distant relatives by comparing thousands of SNPs typed from crime scene DNA. Investigators can submit the raw data files from the crime scene DNA to one of the new genealogy databases to find possible relatives of the person who left the evidence. While the suspect may not be in CODIS and may not have submitted his or her DNA to the genealogy site, the DNA of any of his or her relatives who have innocently submitted their data for genealogy search purposes can lead police to a range of possible persons of interest.

The SNP comparison process will be explained and differentiated from other traditional DNA-based familial searches. The results of DNA-based genealogy searching still require careful data analysis and follow-up investigation by police to further narrow the range of possible persons of interest based on age, locale, and other factors associated with the crime. Once a person of interest has been identified, police then need to obtain a known DNA sample from that person. This has been done surreptitiously using discarded DNA without a warrant (e.g., reportedly from a discarded tissue in the "Golden State" investigation). After that DNA profile is related to the crime scene specimen, the police then have the basis for a warrant. The entire process may raise potential issues under the Fourth Amendment, particularly considering the recent *Carpenter* United States Supreme Court opinions, as well as online e-privacy laws. The social, ethical, and policy implications of genealogics will also be discussed.

Genealogy Databases, DNA, Crime and Genealogy