## LW7 The Phoenix Canal Murders + Forensic Genealogy = Solved!

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After attending this presentation, attendees will understand how Y-chromosome DNA (Y-DNA) analysis methods borrowed from the genetic genealogy community led to an arrest in a 25-year-old serial killer case when all other investigative methods had failed. Although the techniques described have been used successfully by the genetic genealogy community for many years for surname studies, they are relatively new to law enforcement. Attendees will better understand a novel identification technique they may not yet be aware of, but that has the potential for immediate use by the forensic community for solving cold cases and identifying John Does in the absence of a Combined DNA Index System (CODIS) hit.

This presentation will impact the forensic science community by demonstrating the successful resolution of a cold case through the use of techniques borrowed from genetic genealogy. This presentation will broaden the understanding of various types of metadata that can be extracted about an unknown perpetrator from a match between his Y-DNA profile and public genetic genealogy databases, leading to an appreciation of genealogical Y-chromosomal Short Tandem Repeat (Y-STR) testing as an alternative source of generating investigative leads for cold cases.

One evening in 1991, Angela Brosso went for a bicycle ride along the Arizona Canal in Phoenix, AZ. She never returned home. Her body was found nearby in a vacant lot a few days later. Melanie Bernas went for a bicycle ride along the same canal in early 1992. She never returned either. Her body was found floating in the canal a few days later. The Canal Murders were apparently random killings in which the perpetrator had no connection to his victims, limiting the effectiveness of conventional investigative techniques. Over the years, numerous suspects were investigated, but with no success. There was no CODIS hit to the DNA from the crime scenes.

The Phoenix Canal Murders remained unsolved until 2014, when the Phoenix Police Department asked for the comparison of the Y-DNA collected from the crimes to genetic genealogy Y-STR profiles posted on public websites. Using in-house software to interrogate thousands of public genealogical databases, a Y-DNA match was found to a small group of Millers of Irish origin. This narrowed the list of suspects from perhaps 2,000 individuals to just 5. This led the authorities to arrest Brian Patrick Miller, who is to be tried for the murders of both women.

The Phoenix Canal Murders are only one example of how cold case investigations are benefitting from the use of genealogical resources. A match between a forensic Y-profile and a profile found in a genetic genealogy database can advance a cold case investigation in many ways. Perhaps the most interesting is that forensic genealogy, used in conjunction with DNA phenotyping, is making it possible to predict the appearance, ethno-ancestry, and last name of a killer, based on DNA alone.

Included in this presentation are results from other cases that have benefitted by comparisons to the ~300k Y-STR profiles posted online by the genealogy community; these results are based on surprising leads generated for ethnicity, nationality, and geographic origins, even in the absence of a surname match.

**Phoenix, Canal, Genealogy**



*Presenting Author