

# HOMEWORK 6: INTRODUCTION

CSE 491 section 3

Spring 2019

Kevin Liu, Ph.D.

Michigan State University

# DNA Forensics



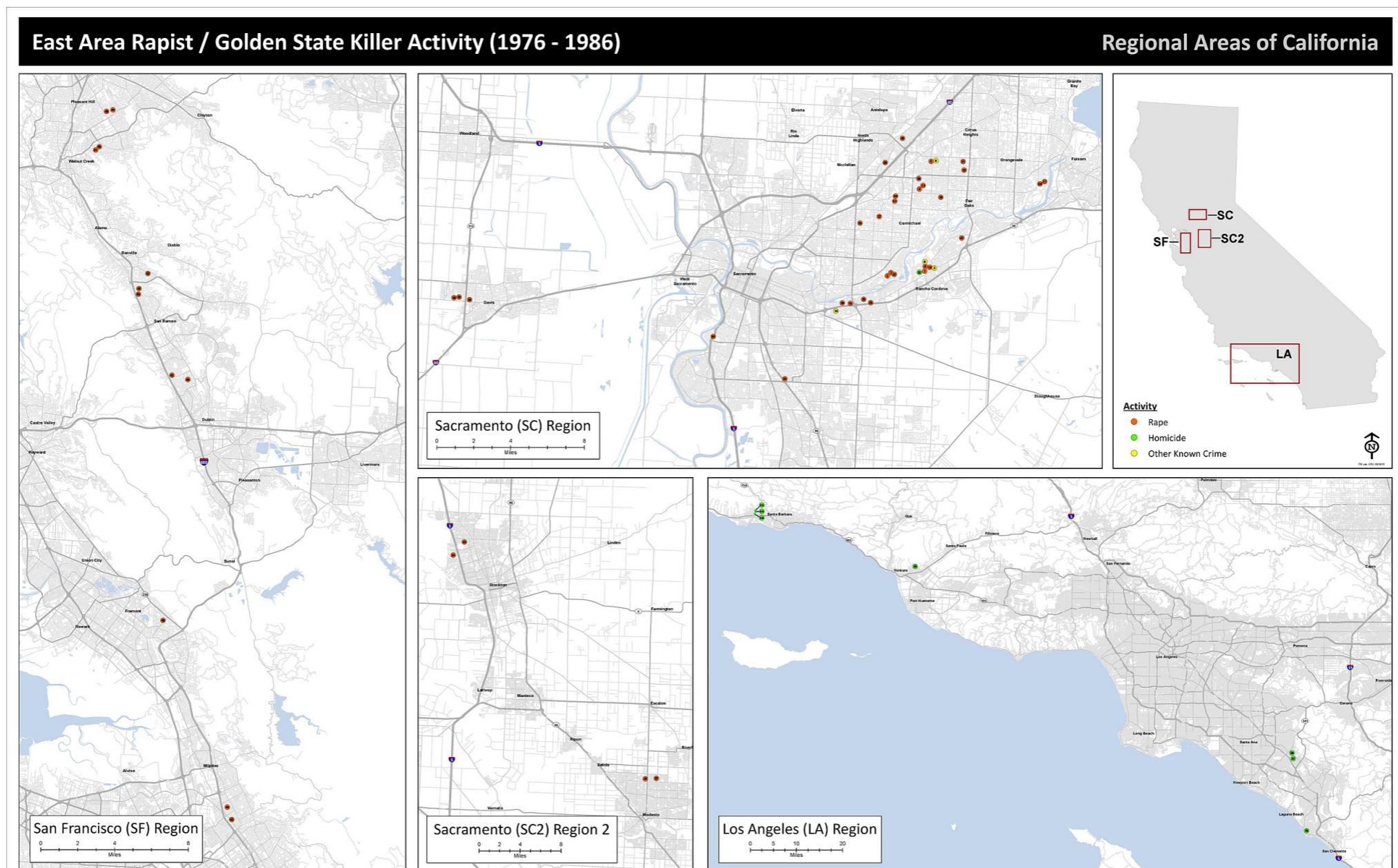
Image from Science Magazine (doi:10.1126/science.aau5499)

# National Forensic DNA Databases

Country (Year established)	Reference profile size	Crime-scene sample size	Suspect to scene hits	Scene to scene hits	Entry criteria for suspects	Entry criteria for convicted offenders	Removal criteria
UK (1995)	2.5 million	200,000	550,000	30,000	Any recordable offence*	Entered as suspect	Never removed, including suspects
USA (1994)	1.52 million	67,000	Figure unavailable	Figure unavailable	No suspects entered, but under revision	Depends on state law	Depends on state law
Germany (1998)	286,840	54,570	13,700	5,500	Offence leading to >1 yr in prison	After court decision	After acquittal or 5–10 years after conviction, if prognosis is good
Austria (1997)	64,740	11,460	3,200	1,350	Any recordable offence*	Entered as suspect	Only after acquittal
New Zealand (1996)	44,000	8,000	4,000	2,500	No suspects entered	A relevant offence (including ≥7 yr in prison)	Never removed, unless conviction quashed
Switzerland (2000)	42,530	7,240	4,840	5,540	Any recordable offence*	Entered as suspect	After acquittal or 5–30 years after conviction
France (2001)	14,490	1,080	50	70	No suspects entered	Sexual assault and serious crime	40 years after conviction
Finland (1999)	8,170	5,450	2,080	780	Offence leading to >1 yr in prison	Entered as suspect	Only after acquittal
Slovenia (1998)	4,820	2,360	370	80	Any recordable offence*	Entered as suspect	Depends on severity of crime
Netherlands (1997)	4,260	13,700	2,520	4,260	No suspects entered‡	Offence leading to >4 yr in prison	20–30 years after conviction
Sweden (2000)	3,980	9,860	2,500	4,750	No suspects entered	Offence leading to >2 yr in prison	10 years after release from prison

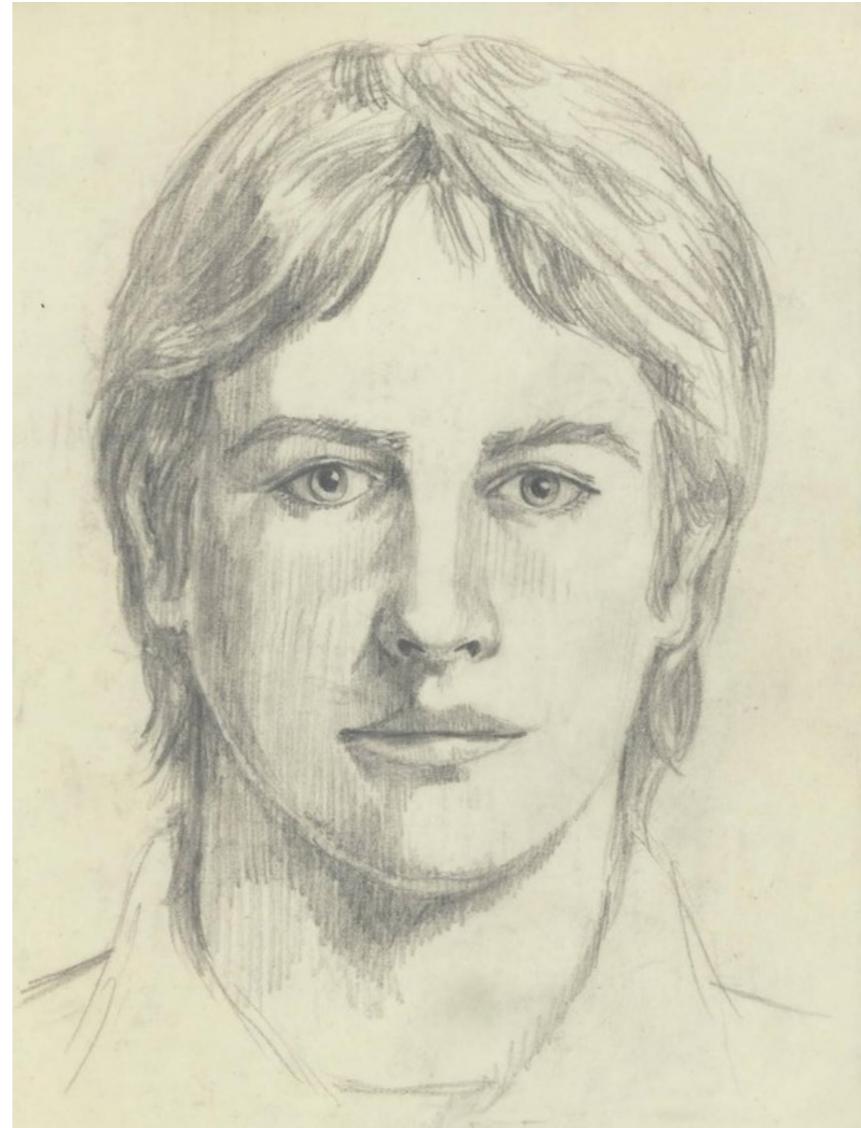
# THE GOLDEN STATE KILLER (GSK) CASE

# A Notorious Cold Case (1974-1986): The GSK Investigation



Map from FBI website: <https://www.fbi.gov/file-repository/caregions060816.pdf/view>

# A Notorious Cold Case (1974-1986): The GSK Investigation



# FBI Billboard From 2016

**SEEKING  
INFORMATION:**

**Unknown Suspect**

**East Area Rapist / Golden State Killer  
1976-1986**

**1-800-CALL-FBI**  
**REWARD UP TO \$50,000**

 **FBI**

  
**Rendered 1978**

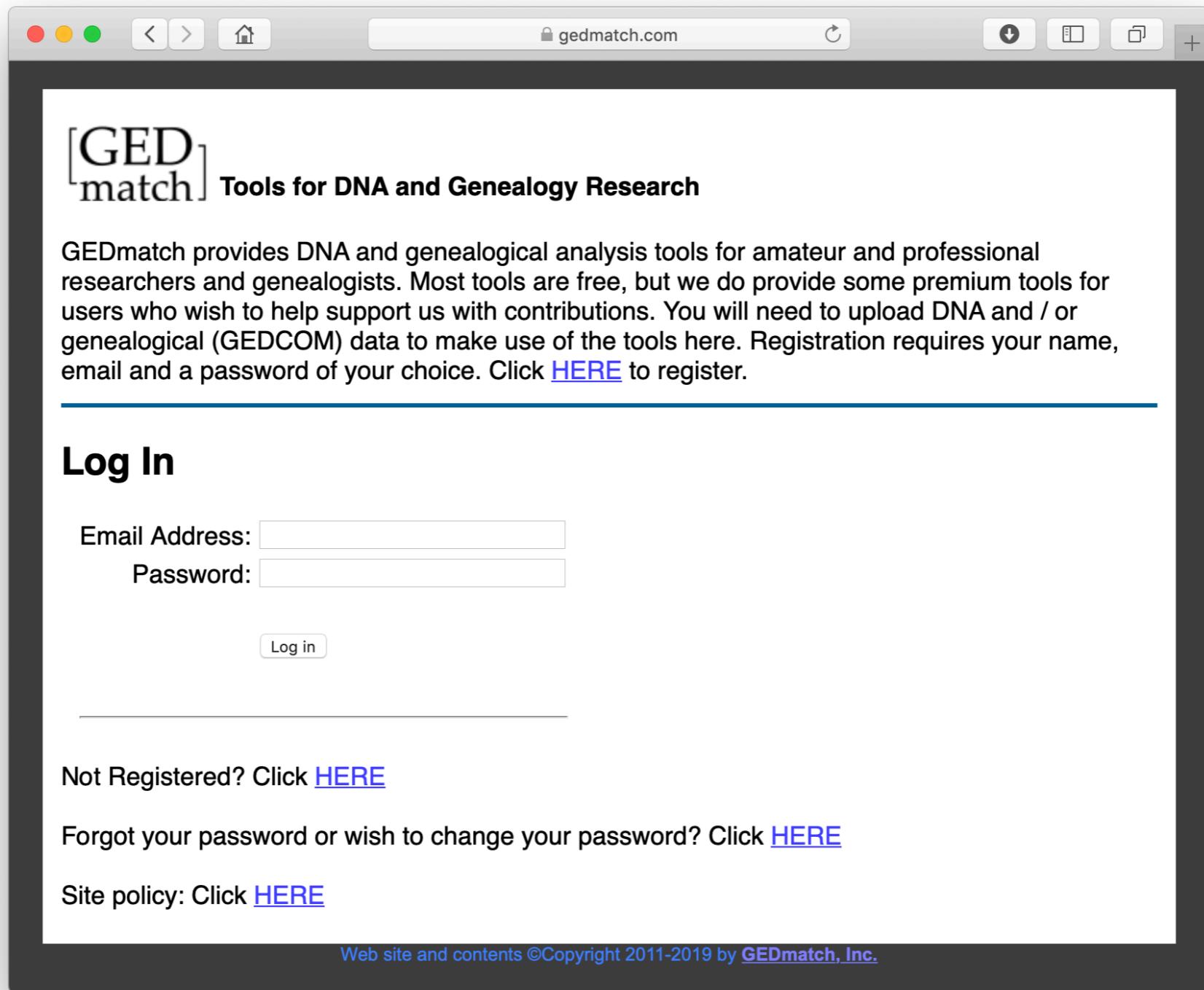
Image from <https://www.fbi.gov/news/stories/2016/june/help-us-catch-the-east-area-rapist/image/east-area-rapist-billboard>

# A BREAKTHROUGH IN THE GSK CASE

# Direct-to-Consumer DNA Sequencing Services

The screenshot shows the 23andMe website homepage. At the top, there's a navigation bar with links for "OUR SERVICES", "HOW IT WORKS", "REPORTS", "STORIES", "SHOP", "SIGN IN", "REGISTER KIT", and "HELP". The main feature is a large image of a young woman with dark hair. Overlaid on the image are several colored bars representing genetic traits. Labels include "LACTOSE INTOLERANCE" (blue), "CILANTRO TASTE AVERSION" (purple), and "EYE COLOR" (teal). Below these labels are two service offerings: "Ancestry Service" and "Health + Ancestry Service", each accompanied by an image of a saliva collection kit box. A pink "shop" button is located near the woman's shoulder. To the right, there's a section titled "Live in the know<sup>SM</sup>" with text about personalized reports. A "Feedback" button is visible on the far right.

# Public Genealogical Databases

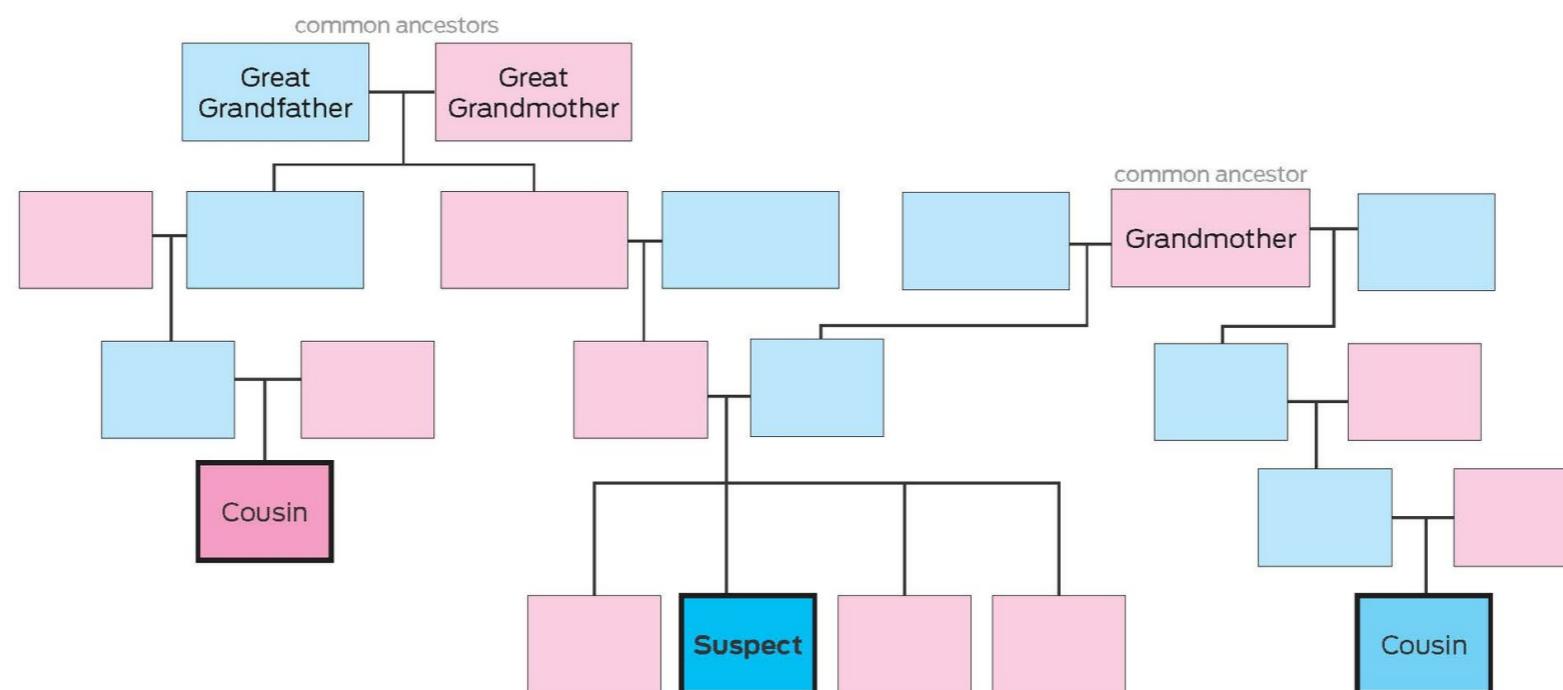


The screenshot shows a web browser window for GEDmatch.com. The title bar reads "gedmatch.com". The main content area displays the GEDmatch logo and tagline "Tools for DNA and Genealogy Research". A descriptive paragraph explains the site's purpose: "GEDmatch provides DNA and genealogical analysis tools for amateur and professional researchers and genealogists. Most tools are free, but we do provide some premium tools for users who wish to help support us with contributions. You will need to upload DNA and / or genealogical (GEDCOM) data to make use of the tools here. Registration requires your name, email and a password of your choice. Click [HERE](#) to register." Below this is a "Log In" section with fields for "Email Address" and "Password", and a "Log in" button. At the bottom, links include "Not Registered? Click [HERE](#)", "Forgot your password or wish to change your password? Click [HERE](#)", and "Site policy: Click [HERE](#)". The footer contains the copyright notice "Web site and contents ©Copyright 2011-2019 by GEDmatch, Inc."

# A Breakthrough: Reconstructing Genealogy using GEDMatch

## Cook/Van Cuylenborg Double Homicide Cold Case

Suspect family tree based on genetic genealogy



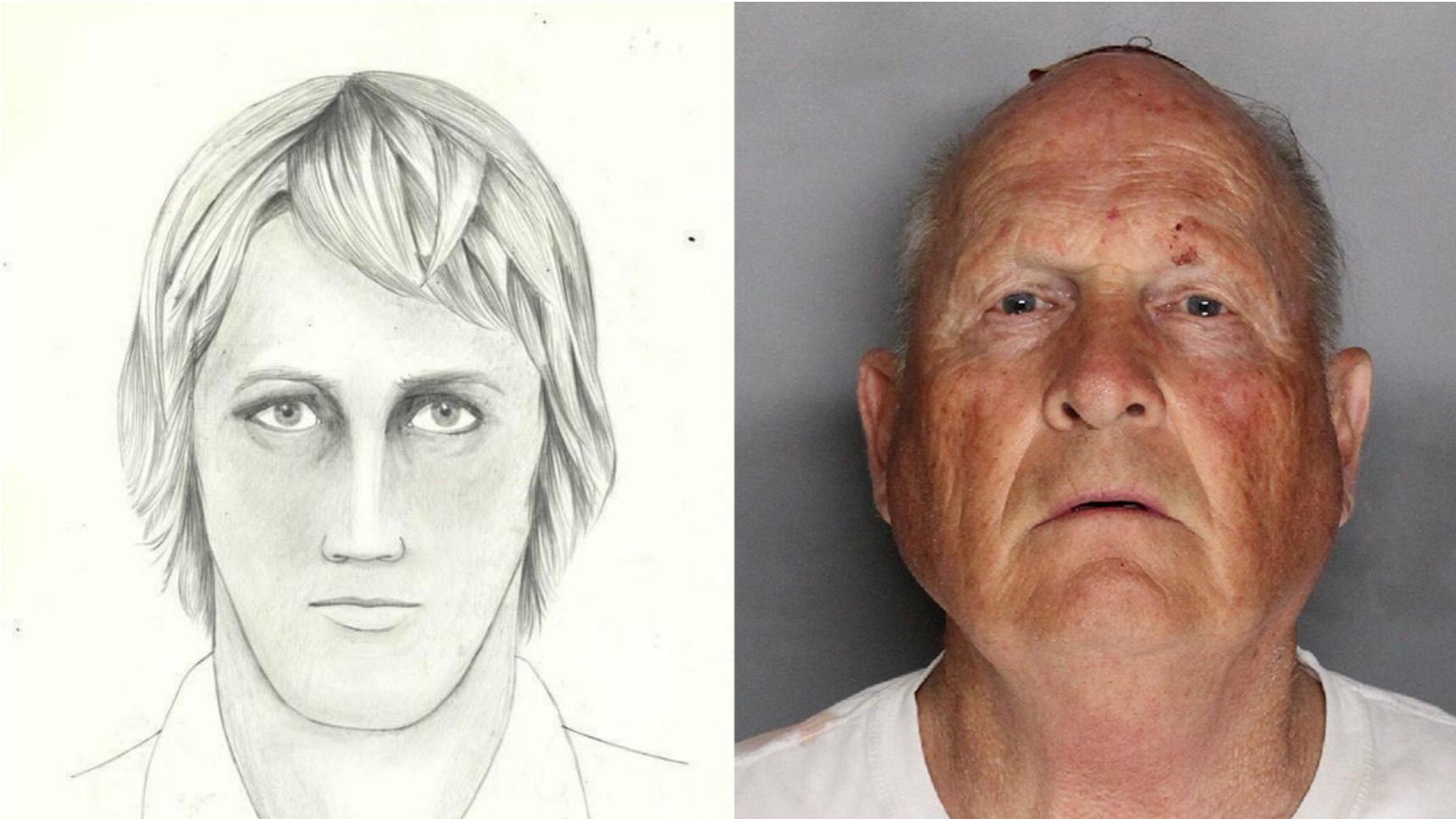
If you have information related to this case, please call 425-388-3845



Image from

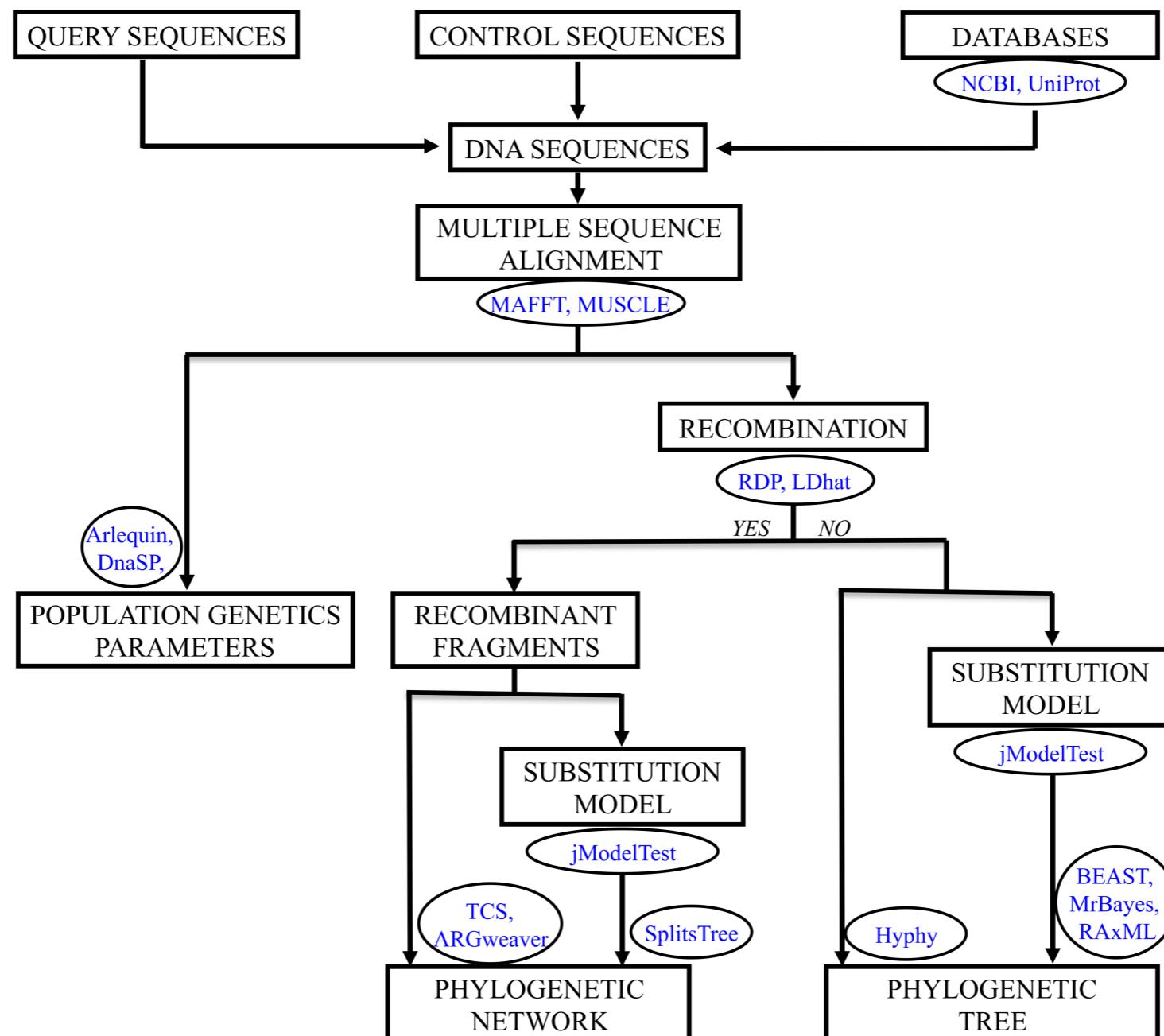
<https://www.nytimes.com/2018/05/18/science/ancestry-site-arrest-washington.html>

# A Breakthrough: Suspect Apprehended



GSK is Joseph James DeAngelo,  
a 72-year-old retired police officer in California.

# Genetic Genealogy/Phylogenetics and Criminal Forensics



HOMEWORK 6  
IS NOW AVAILABLE  
ON D2L