DNA and Cold Cases

Using SNP Genotyping to Solve Crimes: The Cold Case of April Tinsley

Steven Armentrout, Ph.D.

Founder and CEO, Parabon

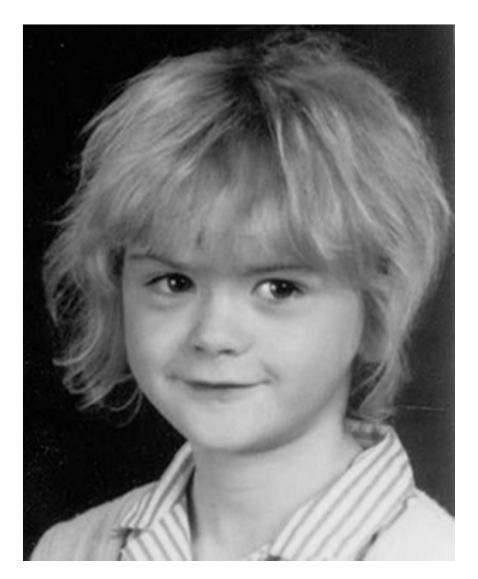
Detective Brian Martin

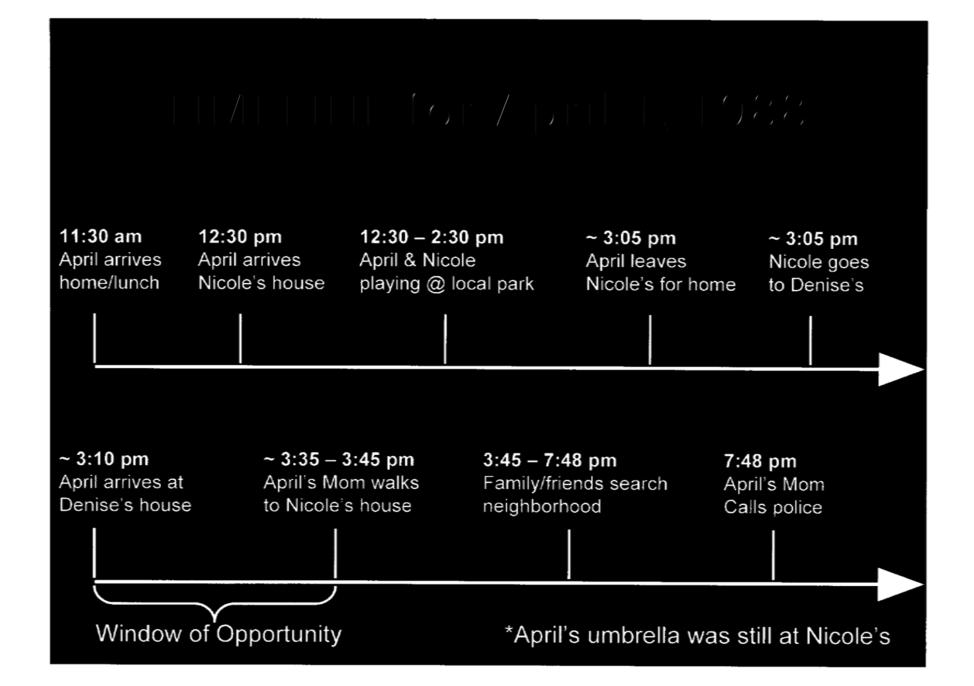
Fort Wayne (Indiana) Police Department

17 July 2019 Chicago

Warning: This presentation contains graphic sexual content

APRIL M TINSLEY

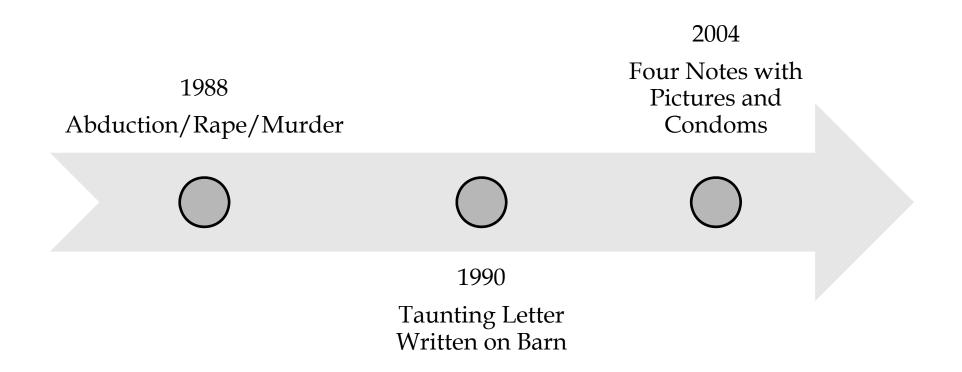




APRIL M TINSLEY BODY DISCOVERED APRIL 4, 1988

- APRIL WAS FOUND 15 FEET OFF ROADWAY IN RURAL AREA.
- □ SIGNS OF SEXUAL ASSAULT.
- □ CAUSE OF DEATH SUFFOCATION.
- MISSING ONE SHOE, WHICH WAS LOCATED 200 FEET FROM HER BODY.

WHAT DO WE HAVE TO WORK WITH?



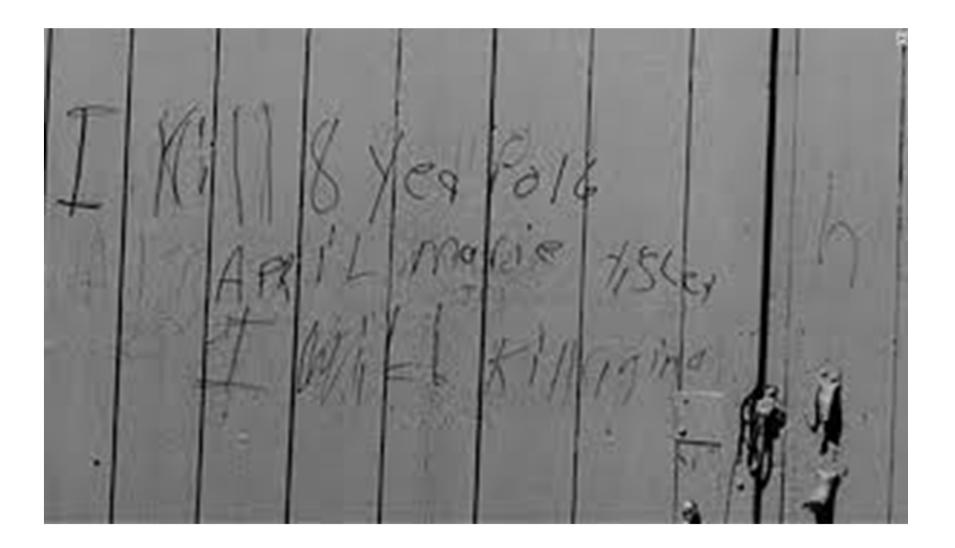
EVIDENCE

- □ THE SUSPECT GAVE US HIS DNA...
- THE SUSPECT GAVE US A SAMPLE OF HIS HANDWRITING...
- THE SUSPECT GAVE US A PARTIAL
 PICTURE OF HIMSELF...

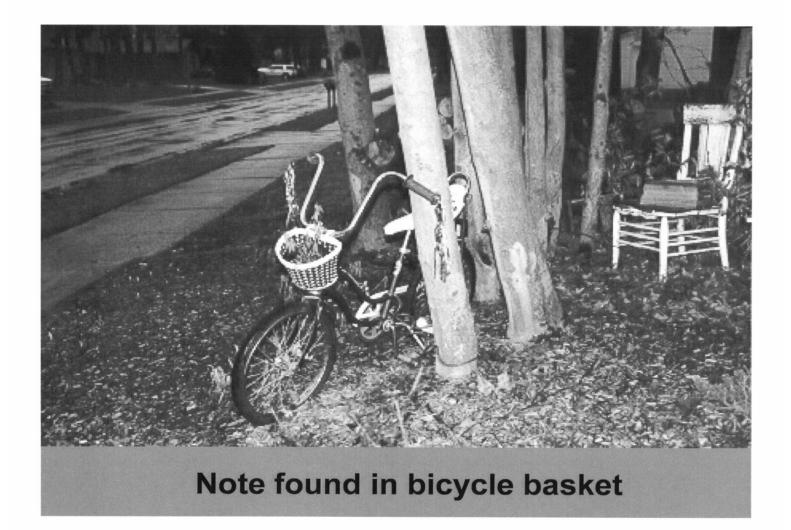
BARN



BARN WRITING



NOTE #1, PICTURE, AND CONDOM LEFT ON BIKE



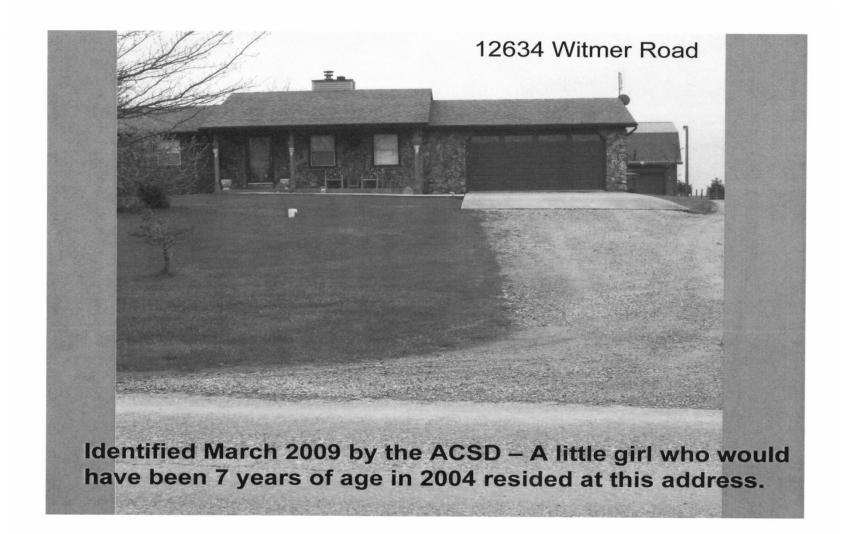
NOTE FROM THE BIKE BASKET

Hittoney Inseen Watching you Iam The Some person that Kinappedan Rapean Kill Aproil Finsely here is a present for yo You are my next vited if you don't Reportini to forice on Fuontse this in the paper. Tommfow or on the MA LOCAL MANCENS

"Hi Honey"
 Stalking Reference
 Demand for media attn.
 Threat to "blow up house"
 Enclosure

Or I well blow up you bay you you will be miner Double underlining Written in pencil on yellow lined legal paper from a pad

NOTE #2, CONDOM DISCOVERED 03-27-2004



THE "PRESENT"



NOTE # 2

Hi Honey I Been Whatingyou here's Some Com foryou Iam the same Person our kanpped 91 Rapean murder APROL tinstey you OUR NEXT Haltaan if I dont see. Note #2 anything about than Thenew pape are on the 3/27/04 TUNEWS I Will BLOW UPYOU hove killing Condom Y cafa m/Ly gny uwill be Mine for over (Gray duct tape?)

Use of

"ha ha"

NOTE #3, AND CONDOM DISCOVERED 06-12-2004



3rd **Note** – 12902 Indiana Street, Grabil, Indiana Found on a 7 yr. old girl's bike in her side yard

NOTE # 3

Hihonay De Ibeen Watching here is some MYCHM Lafor You Iam the Same Person of kingped Rapean Note #3 Kill April tinsley on 6/12/04 Youareney+ iff see you (date notated) OutaLone qnifidont Sec any fining a bout this in new paper or trinews Condom I Will blow up you have Those planted BomB some in you house

NOTE #4, LETTER AND PICTURE DISCOVERED ON BIKE 06-25-2004



LETTER #4

Hittoney 1 Beem Watching you here is More sexually graphic/vulgar in tone than the other notes...contains Polaroids, no some pitcher of My condom. Dick when its is hard Justfor your I can't Wait to bet me hands you so i can fuck you pussy, mouth an ass cum in all three fust Line you pad poes Note #4 6/25/2004 (date notated)

PICTURE WITH LETTER # 4



FBI B.A.U. ANALYSIS OF LETTERS

LINGUISTIC ANALYSIS

BARN GRAFITTI in 1990 and FOUR NOTES in 2004 WERE ALL WRITTEN BY THE SAME PERSON.

WRITER IS A WHITE MALE NATIVE BORN TO U.S.

WRITER IS ATTEMPTING TO DISGUISE HIS TRUE INTELLECTUAL/EDUCATIONAL LEVEL.

DNA RESULTS WERE RETURNED IN 2005

- The DNA profile from the semen found in April's underwear in the 1988 homicide is consistent with the DNA from the semen found in the 3 condoms left in the notes in 2004
- Unidentified latent prints found on the note(s)
- In -Negative in AFIS / Negative in CODIS

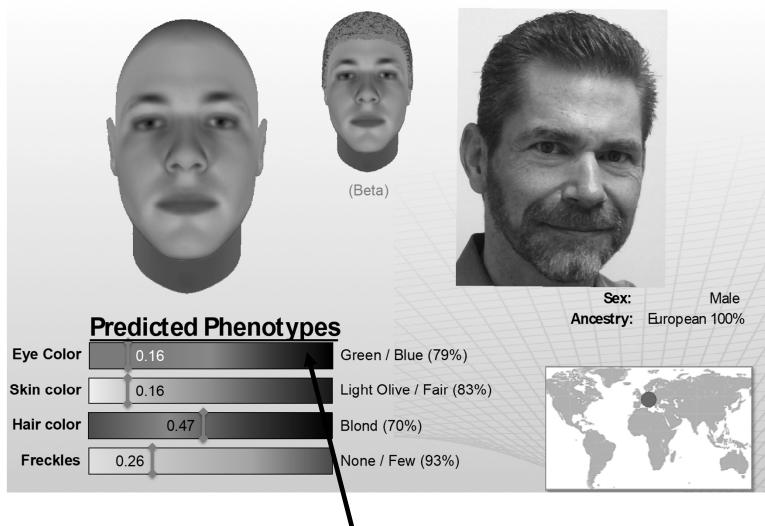
THE SUSPECT LIST

- THE CASE WAS VERY HIGH PROFILE.
- THE SUSPECT LIST WAS OVER 1,300 AT THE TIME OF THE ARREST.
- WE HAD ELIMINATED OVER 900 SUSPECT FROM THE LIST (DNA, JAIL RECORDS).
- THIS CASE WAS FEATURED ON AMERICA'S MOST WANTED, ON THE CASE WITH PAULA ZAHN, CRIME WATCH DAILY, NATIONAL NEWS, AND LOCAL NEWS.

PARABON-FWPD TIMELINE

- Mar 2009: Parabon began promoting forensic use of SNPs to federal government
- Sep 2009: Received a DHS Phase I SBIR award
- Apr 2011: Received a DTRA SBIR Phase I award
- Mar 2012: Received DTRA SBIR Phase II award

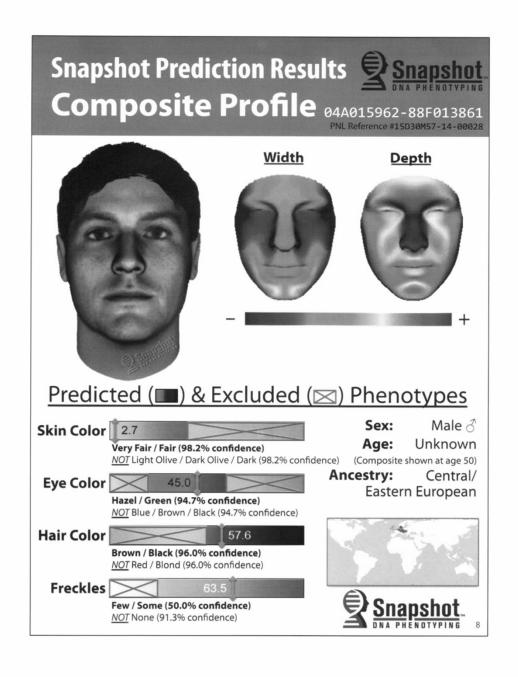
PARABON-FWPD TIMELINE

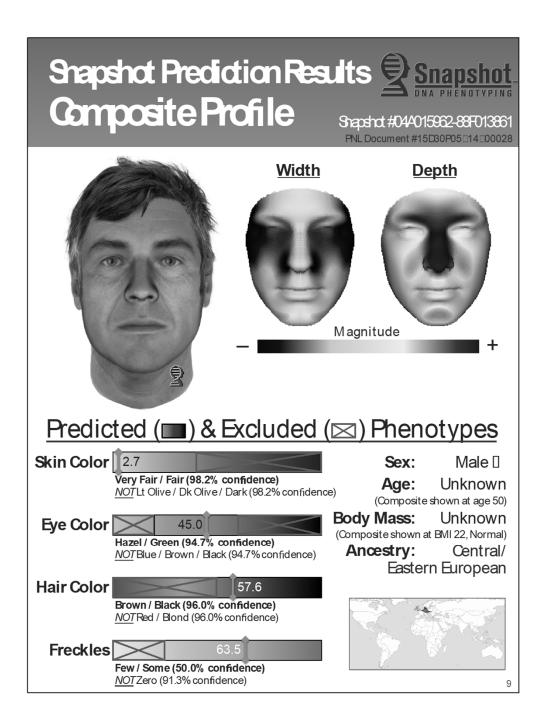


No exclusions

PARABON-FWPD TIMELINE

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- Apr 2011: Received a DTRA SBIR Phase I award
- Mar 2012: Received DTRA SBIR Phase II award
- Oct 2013: Presented Snapshot to NCMEC
- May 2014: NCMEC introduces Parabon to FWPD
- Jul 2014: FWPD ships DNA extract for April Tinsley case to CAFDA for genotyping
- Aug 2014: Parabon delivers Snapshot report to FWPD 1st casework sample analyzed with Snapshot





FAST FORWARD

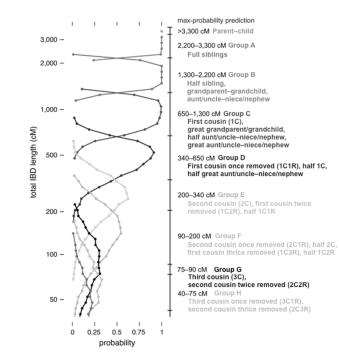
- DETECTIVES CONTINUED TO DO INTERVIEWS, COLLECT BUCCAL SWABS, CONDUCT SURVEILLANCE AT THE GRAVE SITE, AND MEMORIAL SITE.
- DETECTIVES CONTINUED TO USE LOCAL AND NATIONAL MEDIA TO GENERATE TIPS ON THE TINSLEY CASE.
- INFORMATION FROM PARABON WAS USED TO NARROW THE SUSPECT LIST (EYE COLOR, HAIR COLOR, ETC.)

PARABON 2018

- PARABON NANOLABS CONTACTS ME ON MAY 11, 2018. NEW GENETIC GENEALOGY TESTING AVAILABLE.
- PARABON IS CONFIDENT THAT THERE IS AN "ABOVE AVERAGE" CHANCE THAT THEY CAN IDENTIFY A SECOND COUSIN ONCE REMOVED, HALF-SECOND COUSIN, FIRST COUSIN THREE TIMES REMOVED, AND HALF FIRST COUSIN TWICE REMOVED.

PARABON 2018

"Actually, no, we are saying your case has an above average chance. Sorry if that's not coming out clearly. Your case's top cM match is **131.6cM**. Please see the screen capture below that I find to be fairly helpful. 90-200cM are the light green group **F**. They include second cousins once removed, half-second cousins, first cousins thrice remove and half first cousin twice removed. There is at least 1 individual who is ~131cM. Whether or not the majority of the family tree is on the databases, we won't know until our genealogist starts working it. ..."



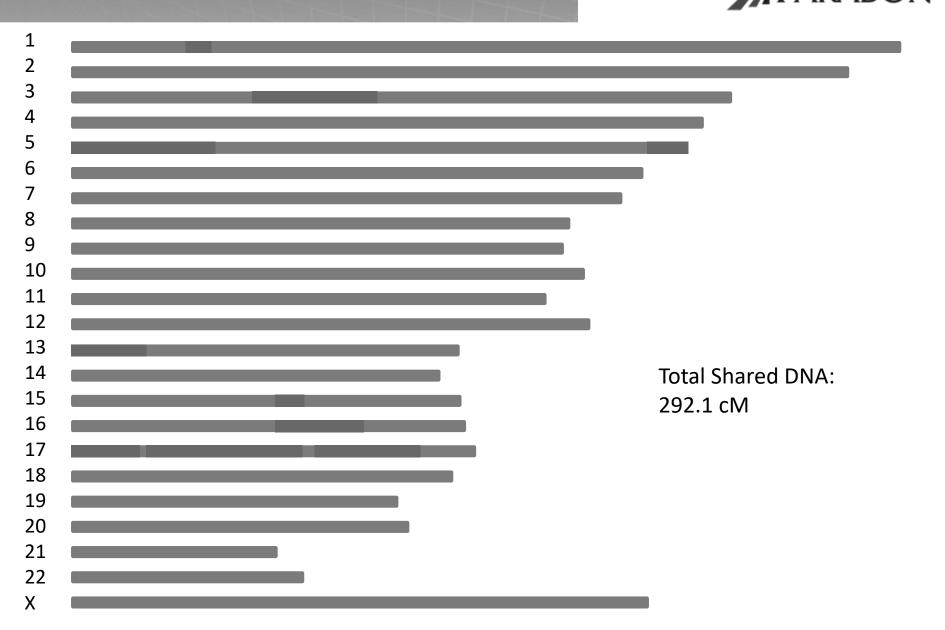
Ball, Catherine A., et al. Ancestry DNA matching (2016)

Annotated by Leah Larkin, Ph.D.

Genetic Genealogy (GG) Analysis MPARABON®



Genetic Genealogy (GG) Analysis MPARABON®



Genetic Genealogy (GG) Analysis MPARABON®



Created by Christa Stalcup ©THEDNADETECTIVES, 2016						
cM (centiMorgans)^		Percentage (%) of Shared DNA^^		Group	Relationship	Notes
Average	Range	Average	Range			
3,600		50%			Parent - Child	
2650	2300 - 3900	37%	32%-54%	Group A	Full Sibling	Ancestry, FTDNA and GEDmatch (HIR only)
3600		50%				23andMe (FIR included)
1800	1300 – 2300	25%	18%-32%	Group B	Half Sibling Aunt/Uncle/Niece/Nephew Double First Cousin Grandparent/Grandchild	3/4 Siblings^^^
900	575 - 1330	12.5%	8%-18.5%	Group C	First Cousin (1C) Half Aunt/Uncle/Niece/Nephew Great-Grandparent/Great-Grandchild Great-Aunt/Uncle/Niece/Nephew	
450	215 - 650	6.25%	3%-9%	Group D	First Cousin Once Removed (1C1R) Half First Cousin (½ 1C) Half Great-Aunt/Uncle/Niece/Nephew	
224	75 - 360	3.125%	1%-5%	Group E	Second Cousin (2C) First Cousin Twice Removed (1C2R) Half First Cousin Once Removed (½1C1R)	
112	30 - 215	1.56%	0.42% - 3%	Group F	Second Cousin Once Removed (2C1R) Half Second Cousin (½ 2C) First Cousin Three Times Removed (1C3R) Half First Cousin Twice Removed (½ 1C2R)	
56	0 - 109*	0.78%	0% - 1.52%	Group G	Third Cousin (3C) Second Cousin Twice Removed (2C2R)	~10% of 3Cs will not share DNA
30	0 - 75**	0.4%	0%-1%	Group H	Third Cousin Once Removed (3C1R) Other Distant Cousins	~50% of 4Cs will not share DNA*

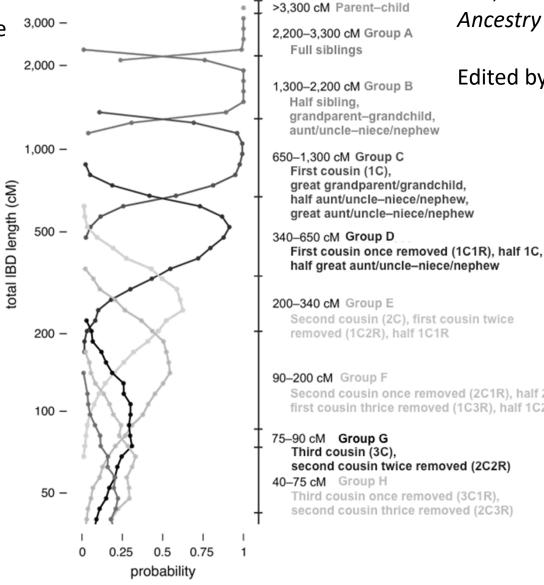
ercentage of DNA = 23AndMe

^^^ 3/4 Siblings are a combination of half siblings and 1st cousins, FIRs are included.

Groups C – I: 95% within the ranges given

DNA Sharing Levels

Different levels of sharing can equate to different types of genetic relationships





Ball, Catherine A., et al. Ancestry DNA matching (2016)

Edited by Leah Larkin, Ph.D.

200-340 cM Group E Second cousin (2C), first cousin twice removed (1C2R), half 1C1R

max-probability prediction

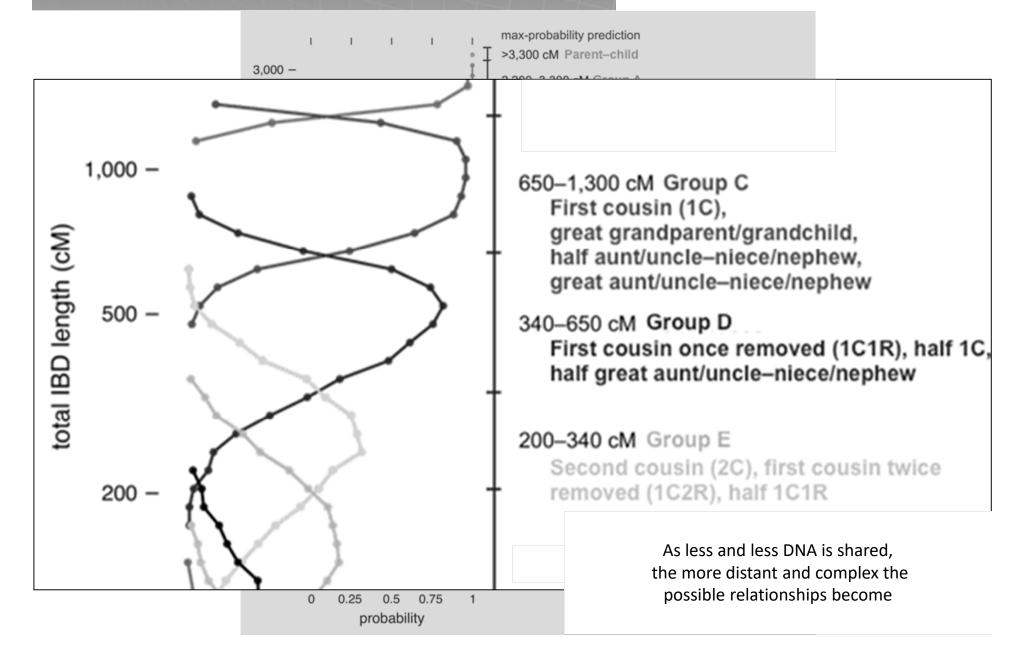
90-200 cM Group F Second cousin once removed (2C1R), half 2C, first cousin thrice removed (1C3R), half 1C2R

75–90 cM Group G Third cousin (3C), second cousin twice removed (2C2R) 40-75 cM Group H Third cousin once removed (3C1R), second cousin thrice removed (2C3R)

DNA Sharing Levels PARABON[®] max-probability prediction >3,300 cM Parent-child 3,000 -2,200-3,300 cM Group A Full siblings 2,000 -1,300-2,200 cM Group B Half sibling, grandparent-grandchild, aunt/uncle-niece/nephew 1,000 -90-200 cM Group F Group B (green) Graphic depicts the Second cousin once removed (2C1R), half 2C, represents less DNA first cousin thrice removed (1C3R), half 1C2R 100 different possible sharing. There are relationships of DNA 75–90 cM Group G multiple DNA Third cousin (3C), sharing levels. second cousin twice removed (2C2R) sharing options to 40–75 cM Group H 50 research. Third cousin once removed (3C1R), Parent – Child & Full second cousin thrice removed (2C3R) Siblings are straightforward with the 0 0.25 0.5 0.75 most DNA sharing levels probability

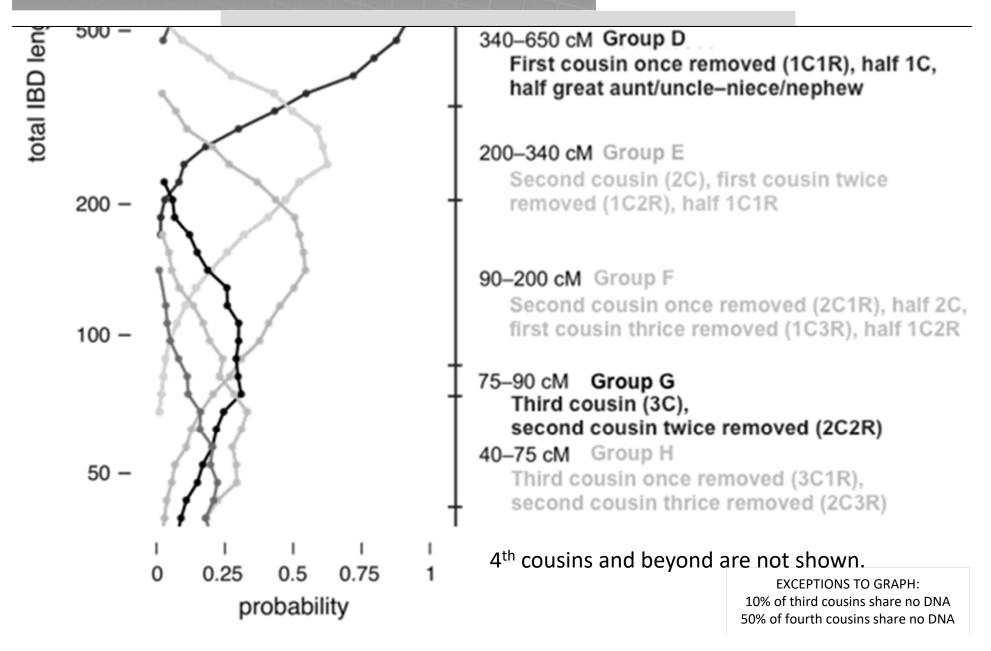
DNA Sharing Levels





DNA Sharing Levels







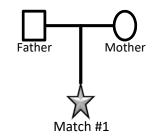
GG Tree Building Example 1

Using Phenotypic Ancestry Info

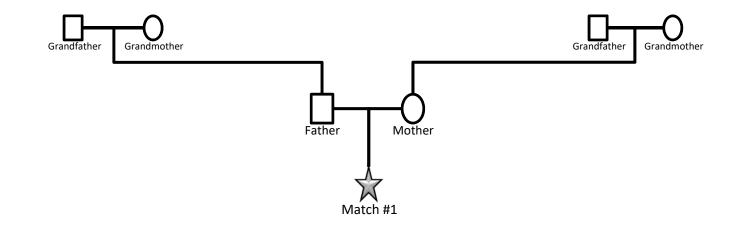




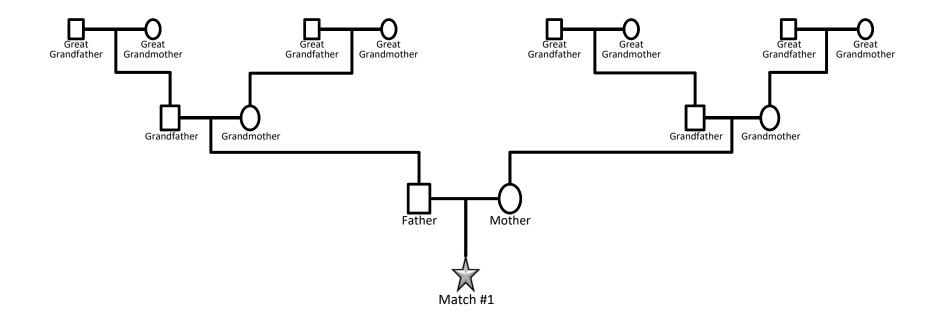




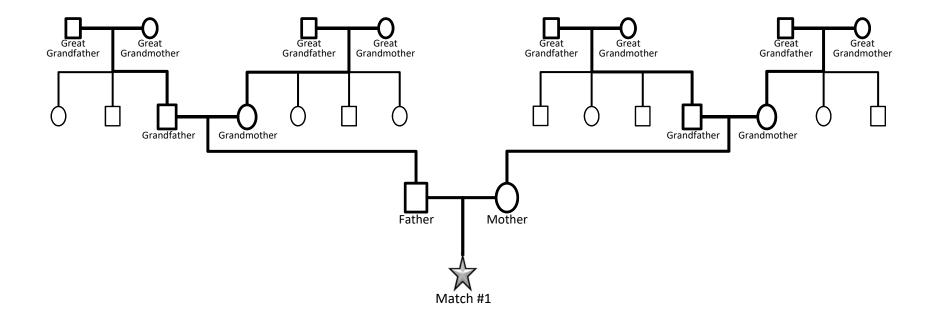




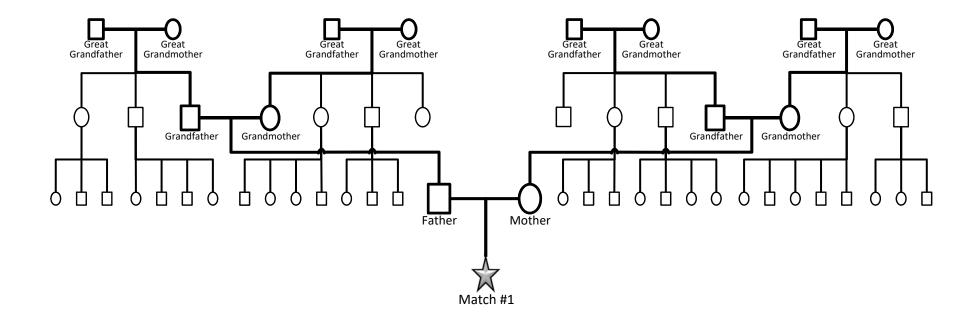




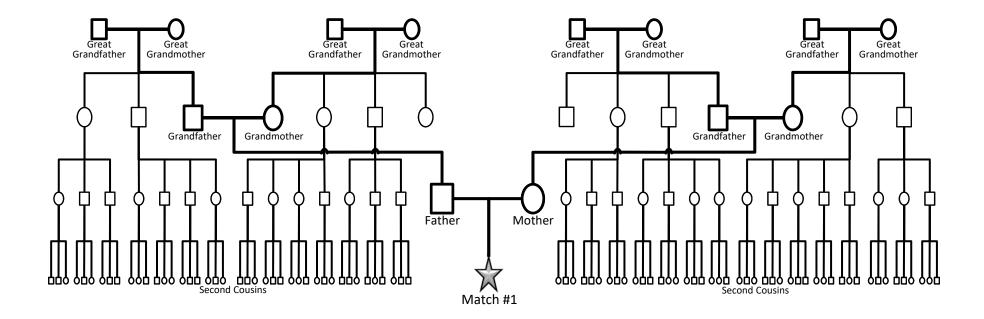




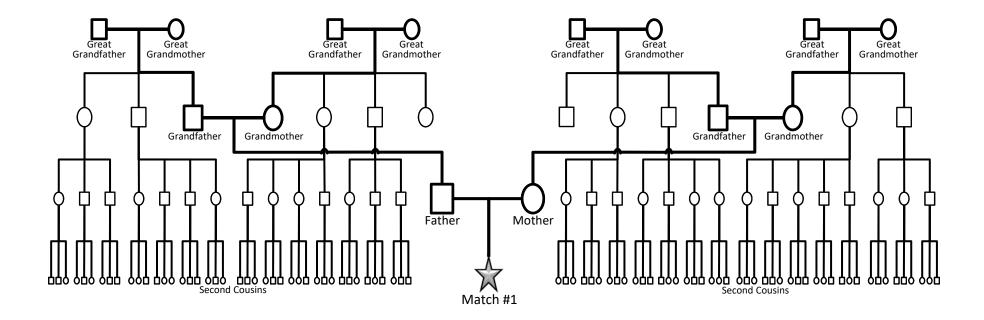








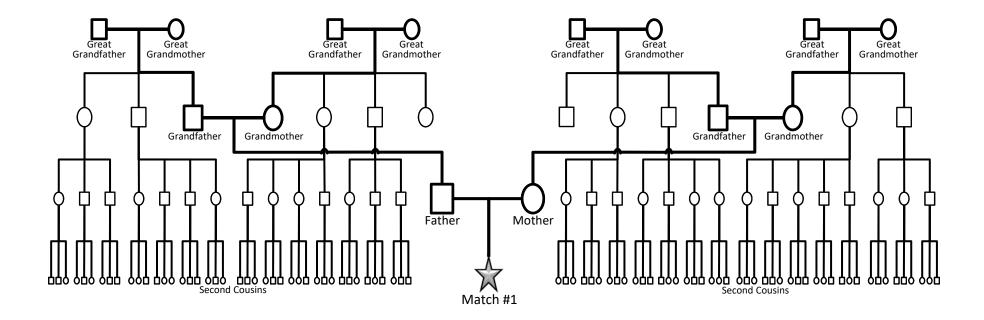




Crime Scene DNA Ancestry:

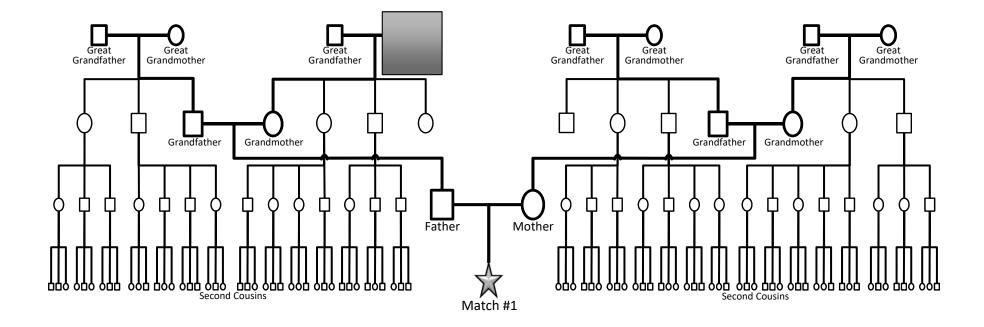
88% Northern European 12% Japanese





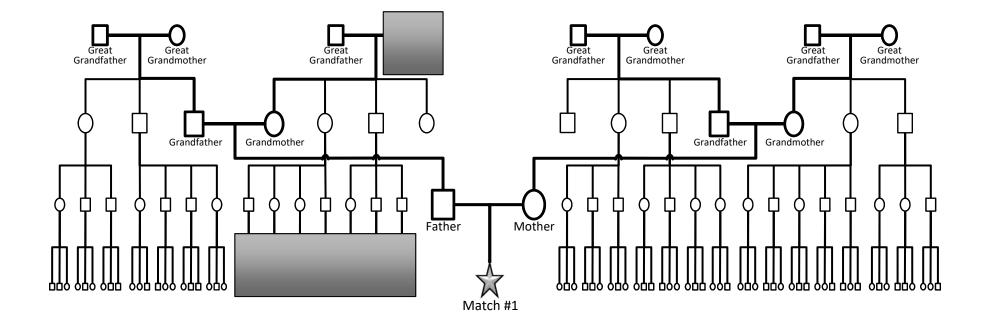
Crime Scene DNA Ancestry: 1/8 Japanese





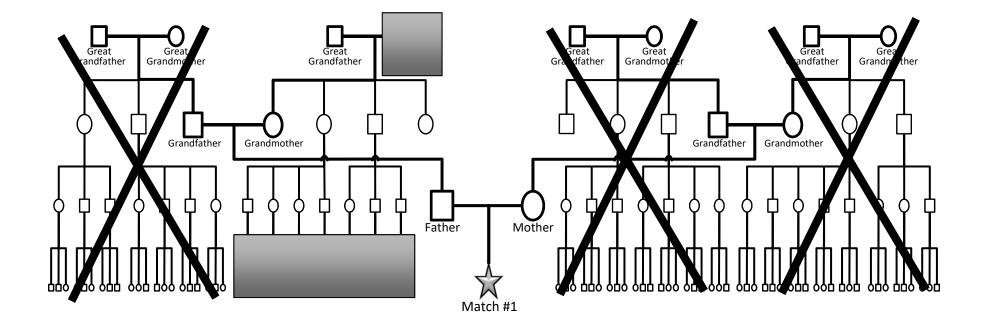
Crime Scene DNA Ancestry: One Japanese Great-Grandparent





Crime Scene DNA Ancestry: One Japanese Great-Grandparent





Crime Scene DNA Ancestry: One Japanese Great-Grandparent



GG Tree Building Example 2

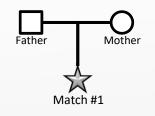
Deciphering between TWO Promising Matches

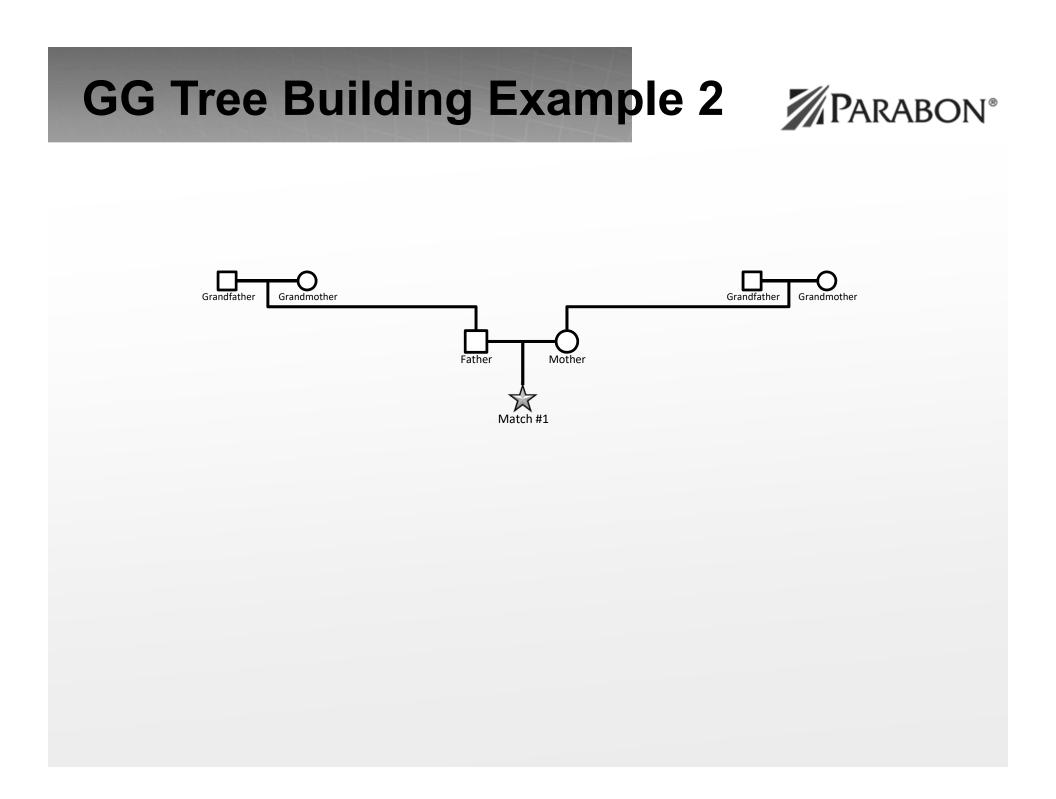




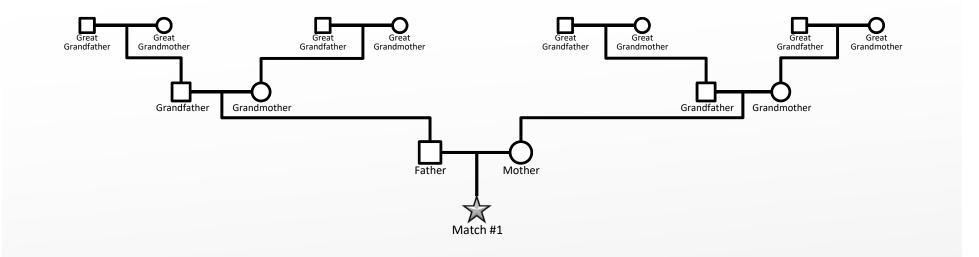




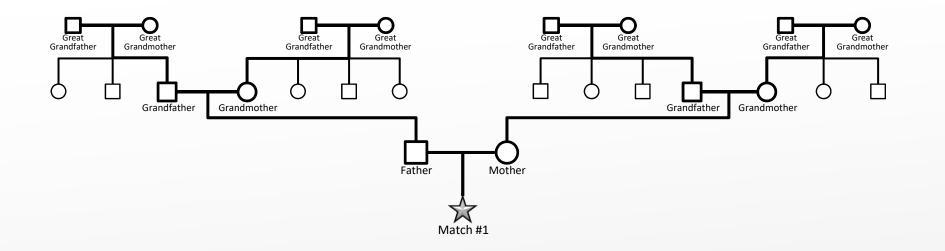




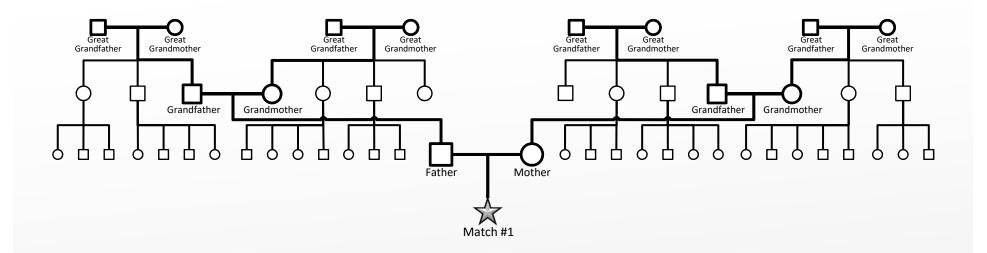




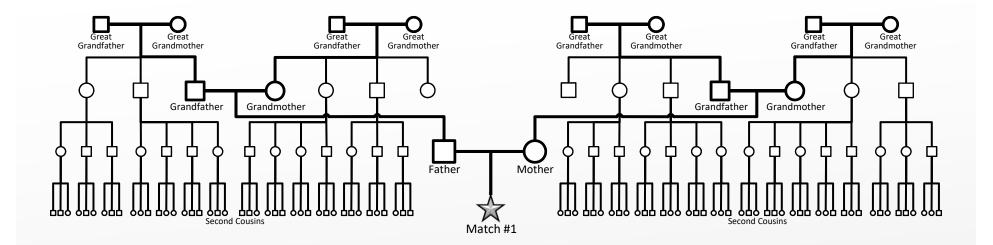




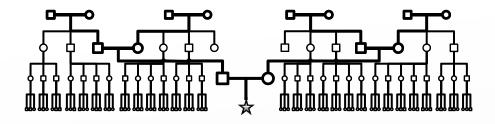




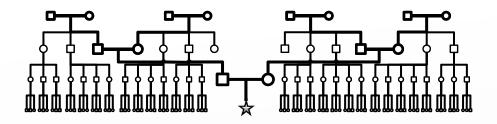






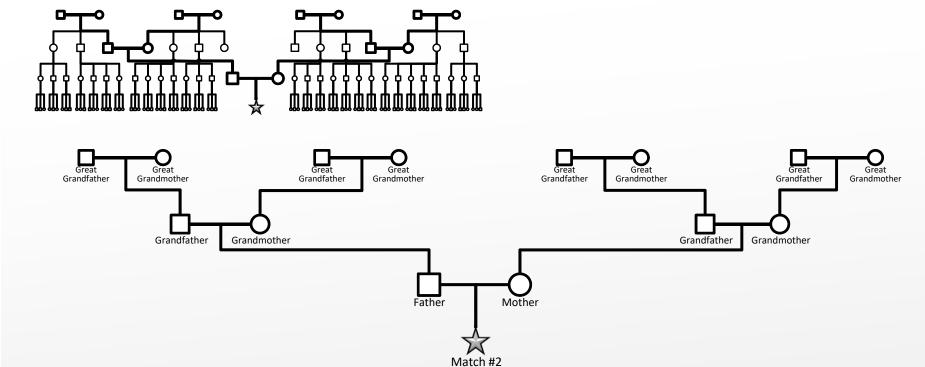






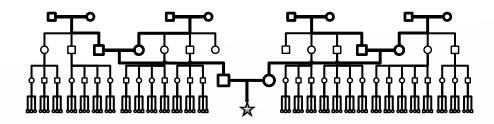


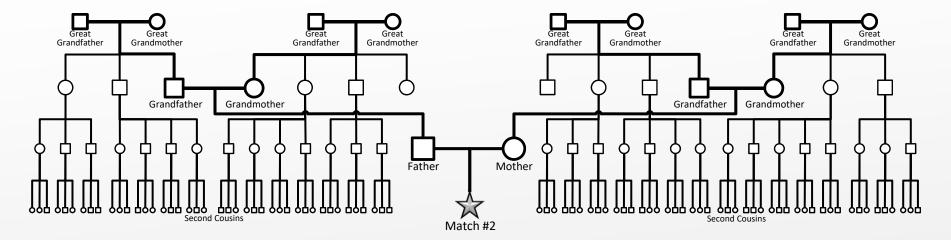




GG Tree Building Example 2

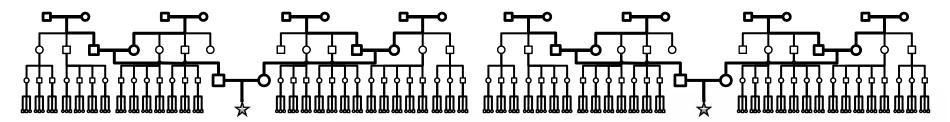






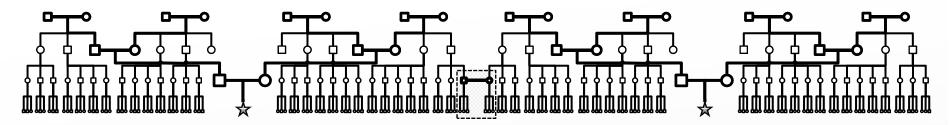
GG Tree Building Example 2





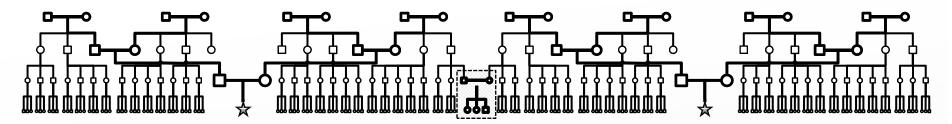
GG Tree Building Example 2





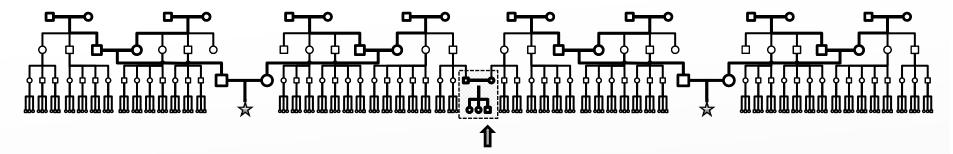
GG Tree Building Example 2





GG Tree Building Example 2





PARABON ON THE CASE

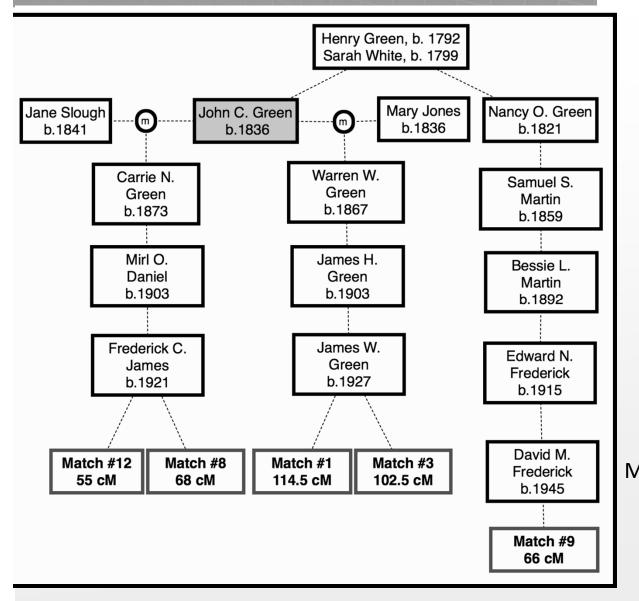


CeCe Moore Chief Genetic Genealogist, Parabon

- One of the original pioneers of genetic genealogy
- Began leading high-profile identification investigations in 2010
- Founded DNA Detectives in 2013
- Performs research for *Finding Your Roots* on PBS
- Has led Parabon's genetic genealogy team to 61 "solves" since May 2018 (> 1 per week)
- Began working the April Tinsley case late June 2018

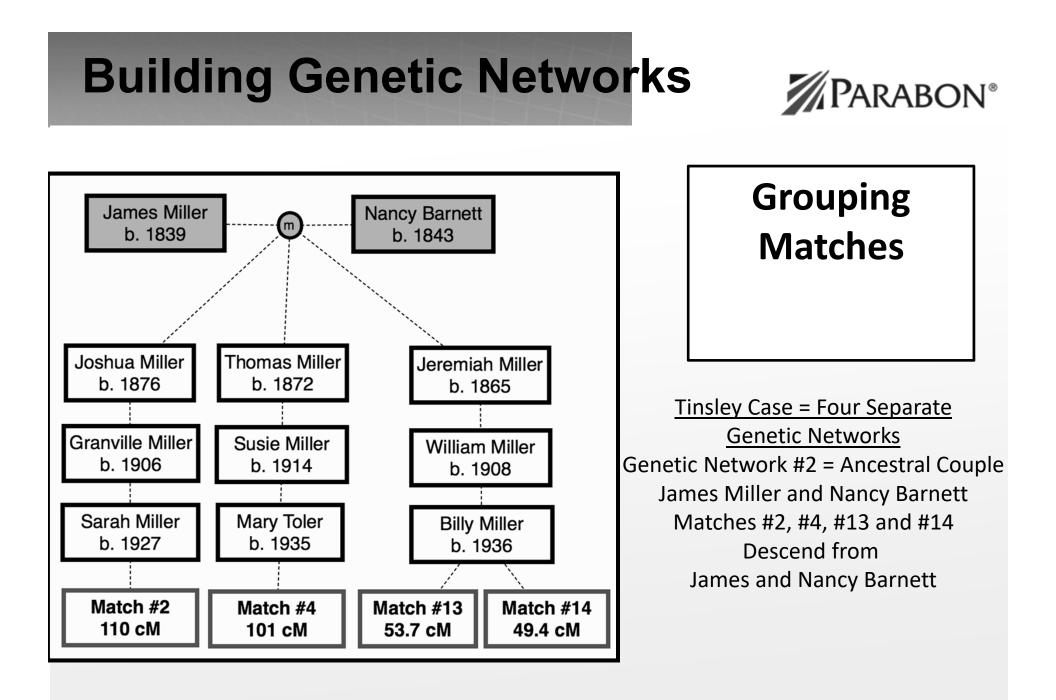
Building Genetic Networks

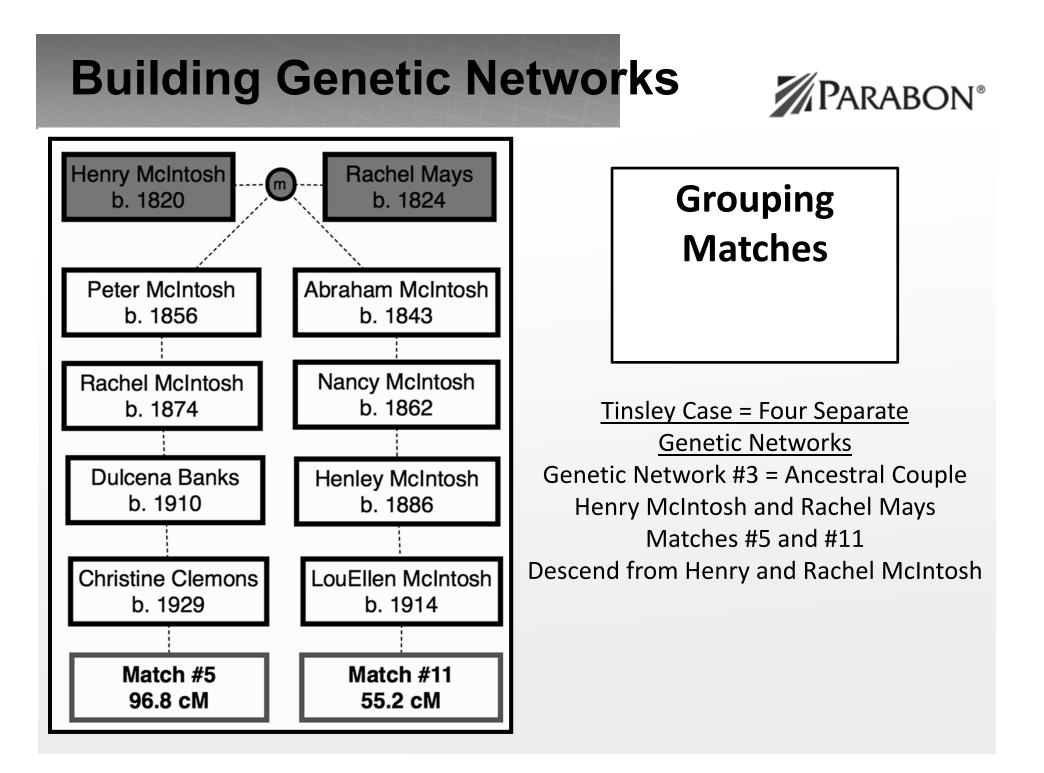


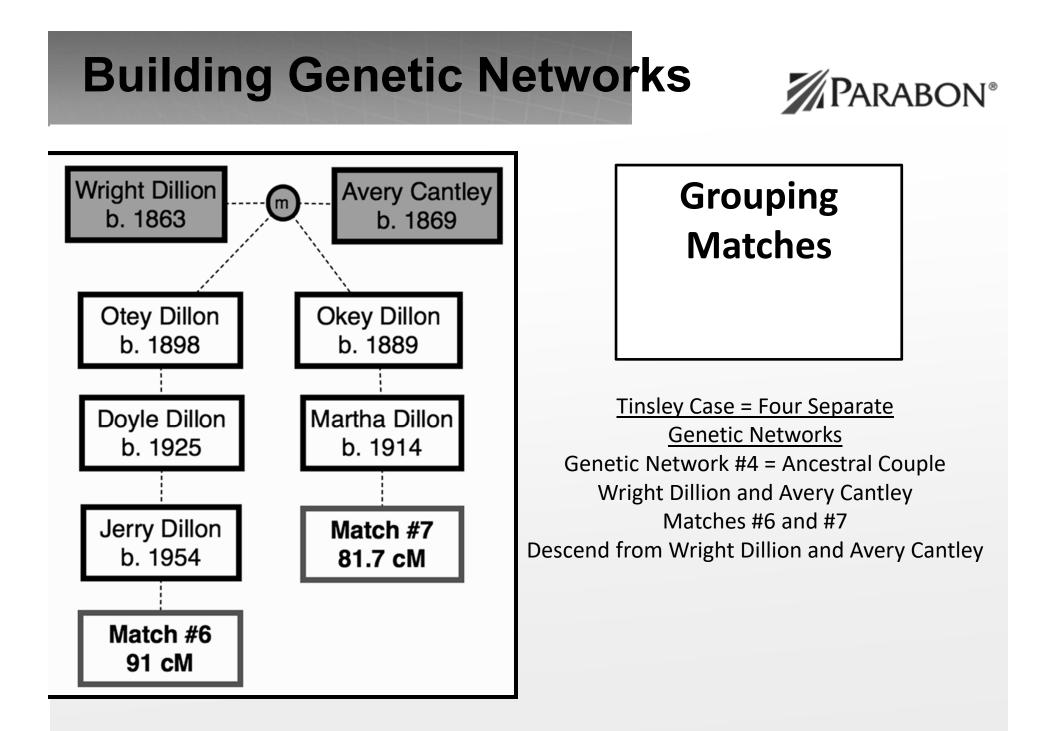


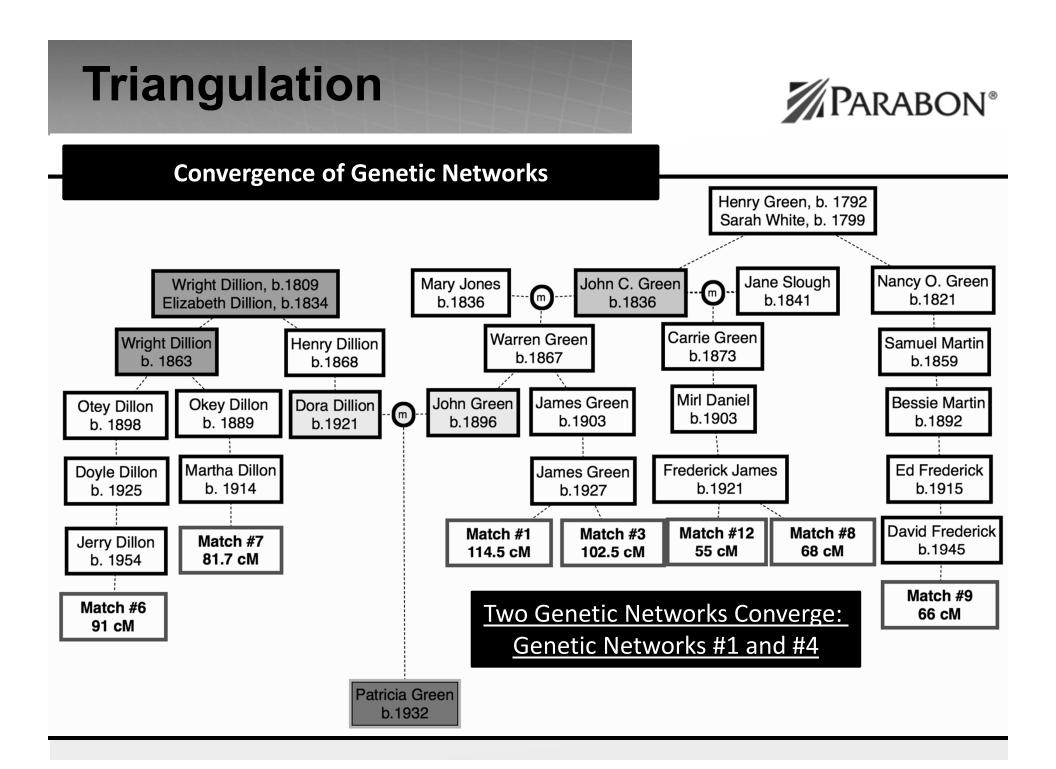


<u>Tinsley Case = Four Separate</u> <u>Genetic Networks</u> Genetic Network #1 = Ancestor John C. Green, b.c. 1836 Matches #1, #3, #8 and #12 Descend from John C. Green and Match #9 descends from his parents





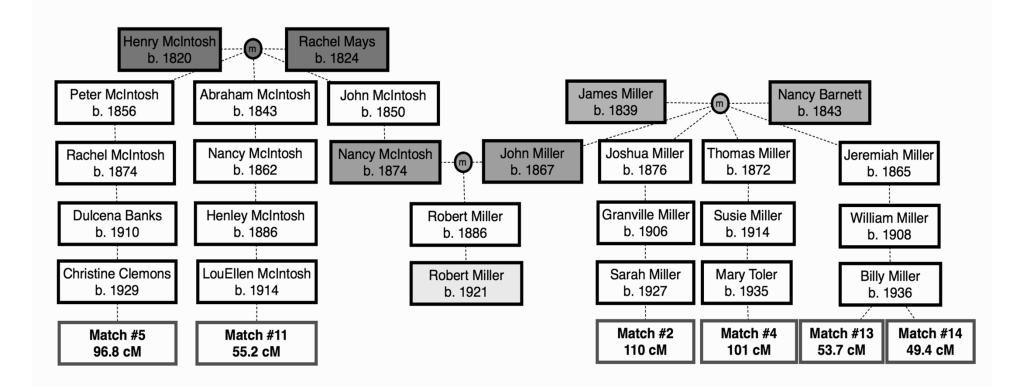




Triangulation



Convergence of Genetic Networks



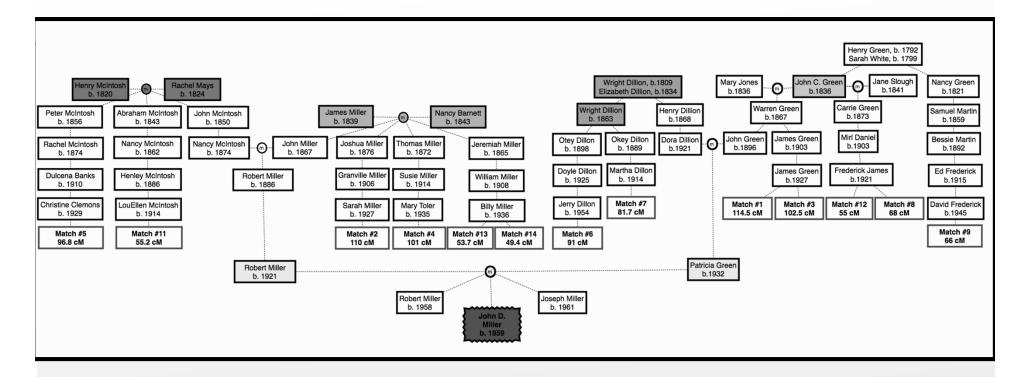
Two Genetic Networks Converge:

Genetic Networks #2 and #3

Convergence



Convergence of Genetic Networks Leads to Suspect

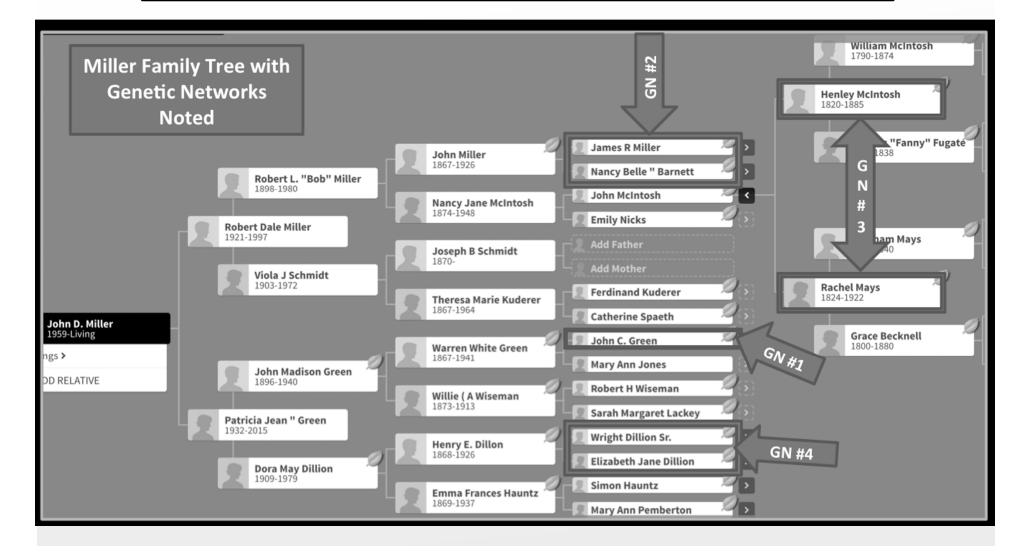


All four Genetic Networks converge through the marriage of Patricia Green and Robert Miller. They had three sons, including John D. Miller, b. 1959

Convergence



Convergence of Genetic Networks Leads to Suspect

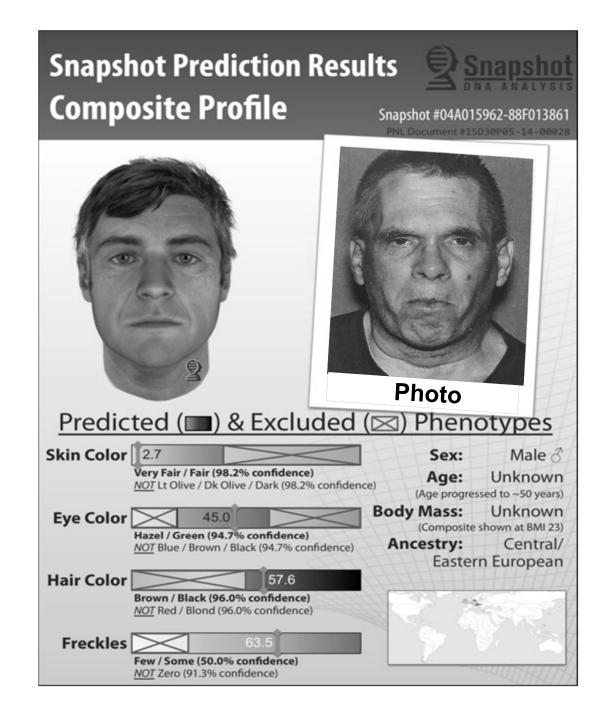


WHAT THE HELL!

- CALL FROM PARABON, WE NEED TO HAVE A CONFRENCE CALL. (07-02-2018)
- I GATHER THE TEAM.
- WE WERE HOPING FOR A GRANDPARENT. WE DIDN'T GET IT! YOUR SUSPECT IS ONE OF TWO BROTHERS!
- WE JUST LOOKED AT EACH OTHER. I SAID HOLY S*** HE IS STILL ALIVE AND WE GOT THIS @#\$!&%.

A FACE TO THE NAMES

- GENETIC GENEALOGY IDENTIFIES JOHN D MILLER OR HIS BROTHER JOSEPH MILLER AS A STRONG SUSPECT.
- NEITHER SUSPECT HAS EVER BEEN ON THE SUSPECT LIST.
- WE INSTANTLY RUN BOTH MEN IN THE LOCAL POLICE DATABASE AND CRIMINAL HISTORY CHECKS.
- WE SET UP SURVEILLANCE ON JOHN MILLER WITHIN TWO HOURS OF THE PARABON CONFRENCE CALL.



JOHN D MILLER

- LIVES IN GRABILL, IN WHICH IS JUST OUTSIDE FT. WAYNE, IN.
- HIS HOME IS WITHIN CLOSE PROXIMIY OF THE 2004 LETTER, PICTURE, AND CONDOMS.
- NO ADULT ARREST. ONE JUVENILE ARREST.
- IDENTIFIED AS A SUSPICIOUS PERSON IN 2002, AND 2003 MAKING SEXUAL COMMENTS TO WOMEN AND CHILDERN IN SHOPPING CENTER PARKING LOTS.

SURVEILLANCE

- DET. CLINT HETRICK (ISP) AND I START SURVEILLANCE ON 07-02-2018.
- WE DISCOVER JOHN MILLER LIVES ALONE.
- JOHN MILLER WORKS 3RD SHIFT AT WALMART, IN KENDALLVILLE, IN.
- DETECTIVES OBSERVE THAT JOHN MILLER MEETS WITH HIS BROTHER, JOSEPH MILLER IN AUBURN, IN.
- HIS TRAILER IS 200 FEET FROM A CITY PARK AND SOFTBALL FIELD.

SUSPECT'S VIEW



PARK AND BASEBALL FIELDS



TRASH PULL

- DETECTIVES MEET AND CONDUCT A COVERT TRASH PULL 07-06-2018.
- WE DISCOVER 3 USED CONDOMS.
- T.V. DINNERS/ WALMART COLA.
- DETECTIVES PACKAGE AND TRANSPORT THE EVIDENCE TO ISP LAB FOR TESTING.
- SURVEILLANCE CONTINUES.

TRASH/EVIDENCE



TRASH/EVIDENCE



SURVEILLANCE



SURVEILLANCE



ISP CONFRIMATION

- ON 07-09-2016 ISP LAB CALLS AND CONFIRMS THAT THE DNA FROM THE CONDOMS FROM JOHN D MILLER'S TRASH ON 07-06-2018 MATCHES THE SUSPECT OF THE APRIL TINSLEY ABDUCTION, RAPE, AND MURDER.
- THE DNA ALSO MATCHES THE CONDOMS LEFT WITH THE TAUNTING LETTERS AND PICTURES.
- JOHN MILLER'S DNA MATCHES PREVIOUSLY UNKNOWN PROFILE ON APRIL'S JACKET.

CONTACT WITH SUSPECT

- ON 07-15-2018 DET. CLINT HETRICK AND I APPROACH JOHN D MILLER.
- JOHN D MILLER HAD JUST GOT OFF WORK AT WALMART AND ARRIVED AT HIS TRALIER.
- JOHN MILLER ASK, "IS EVERYTHING O.K.?"
- JOHN MILLER AGREES TO ACCOMPANY DETECTIVES TO THE POLICE DEPT. TO TALK.

TRANSPORT

- DETECTIVES HAVE SMALL TALK WITH JOHN D MILLER ON THE WAY TO THE STATION.
- JOHN MILLER TELLS US THAT HE LIKES "COP" SHOWS, AND CROSSWORD PUZZLES.
- JOHN MILLER HAS LIVED IN THIS SAME TRAILER SINCE THE MID '80S.
- JOHN MILLER HAS AN INCREDIBLE MEMORY FOR DATES.

INTERVIEW

- DETECTIVES ADVISE JOHN D MILLER OF HIS RIGHTS.
- JOHN MILLER AGREES TO AN INTERVIEW.
- WE ASK JOHN MILLER WHY HE THINKS WE MIGHT WANT TO TALK TO HIM? JOHN REPLIES, "APRIL TINSLEY."
- JOHN MILLER STARTS TO TALK, THEN SAYS, "I CAN'T."

INTERVIEW CONTINUE

- DETECTIVES ARE ABLE TO KEEP JOHN MILLER TALKING.
- JOHN MILLER CONFESSES TO ABDUCTION, RAPE, AND MURDER OF APRIL MARIE TINSLEY.
- JOHN GIVES VERY SPECIFIC DETAILS AND TIMES OF THE ABDUCTION, RAPE, AND MURDER.
- JOHN MILLER APPEARS TO BE RELIVING THE CRIME AS HE IS CONFESSING.

WHAT WE LEARNED

- JOHN MILLER HAS HISTORY OF SEXUAL ASSAULT AS A MINOR.
- JOHN MILLER SPENT TIME IN BOYS SCHOOL AND JUVENILE DETENTION FACILITY.
- JOHN MILLER TRIED AN ABDUCTION WHEN HE WAS 17 YEARS OLD, BUT VICTIM FOUGHT BACK SO HE RAN OFF.
- JOHN MILLER HAS BEEN OUT LOOKING FOR NEW VICTIM BUT COULD NOT FIND AN OPPORTUNITY.

CONTINUED

- JOHN MILLER ADVISED HE HAD A HOMOSEXUAL RELATIONSHIP TO FULLFILL HIS SEXUAL DESIRES, THAT PARTNER WENT IN A NURSING HOME SO THAT ENDED RELATIONSHIP.
- JOHN MILLER ADVISED HE SITS IN HIS TRAILER AND MASTURBATES IN CONDOMS WHILE WATCHING HOMOSEXUAL PORN.
- JOHN MILLER USES THE CONDOMS TO MASTURBATE. (HE SAYS HE DOESN'T WANT TO GET MESSY.)

NEW FACTS FROM INTERVIEW

- JOHN MILLER TELLS US THAT IT TOOK 2 DAYS FOR US TO FIND APRIL'S BODY IN THE DITCH, AND HE HAD ACTUALLY DROVE BY THE DUMP SITE THE NEXT DAY.
- JOHN MILLER TELLS US THAT IT TOOK 2 MONTHS FOR ANYONE TO NOTICE THE WRITING ON THE BARN.
- JOHN NEVER HAD A BLUE TRUCK. HE WAS DRIVING A BLUE MERCURY LYNX.

CONFESSION LETTER

FSOW Aprilitinsley Walking BOWZ the side walk I was standing By May carlfrachere antoldher not scoram putheran My caran prive Dut My Froitor an We Walk inside an icarry here Back Bedroon an had set with her Lifer I killher, then early noff topk to Coutry Road 68 dumpher Body In the Pitch

Oldm D Mile 7/15/18

GENETIC GENEALOGY SUCCESS

- As of June 12 2019, Parabon has provided police with leads resulting in > <u>60</u> positive identifications.
- This number does not include other identifications made by FBI, state and local law enforcement organizations or other labs performing genetic genealogy.