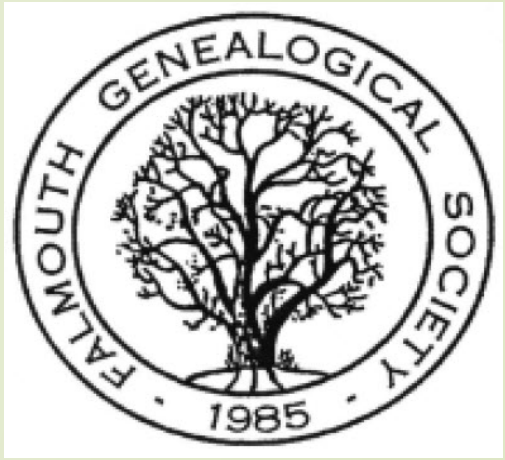
Let's Do Genealogy! Class #4: Genetic Genealogy



Presented by

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of the Falmouth Genealogical Society (FGS)

Prepared for the Falmouth Public Library

Joy of Learning – Nov. 3rd, 2022 7PM

Our FGS links page is here: https://falgen.org/

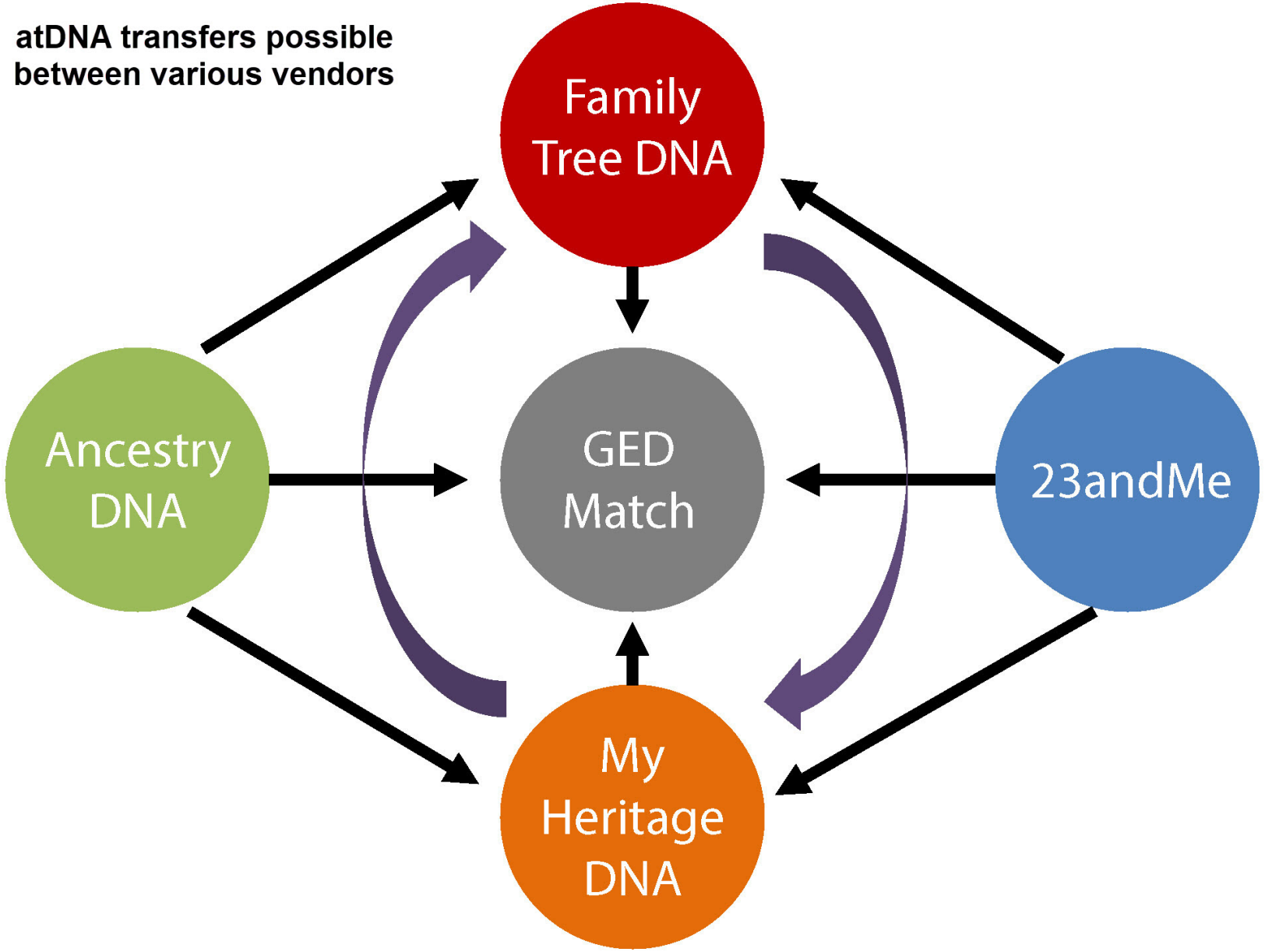
Outline for this talk:

- Types of DNA tests available for Genetic Genealogy:
  - atDNA, Y-DNA, mtDNA
  - X-DNA (23andMe,FTDNA)
- Testing companies for Genetic Genealogy:
  - AncestryDNA, 23andMe, FTDNA, MyHeritage
- Genetic Genealogy Support Websites:
  - GEDmatch, DNApainter, ISOGG
- Identifying DNA matches
- Identifying/Placing mystery individuals
- Case study of a mystery DNA match

Autosomal DNA : atDNA

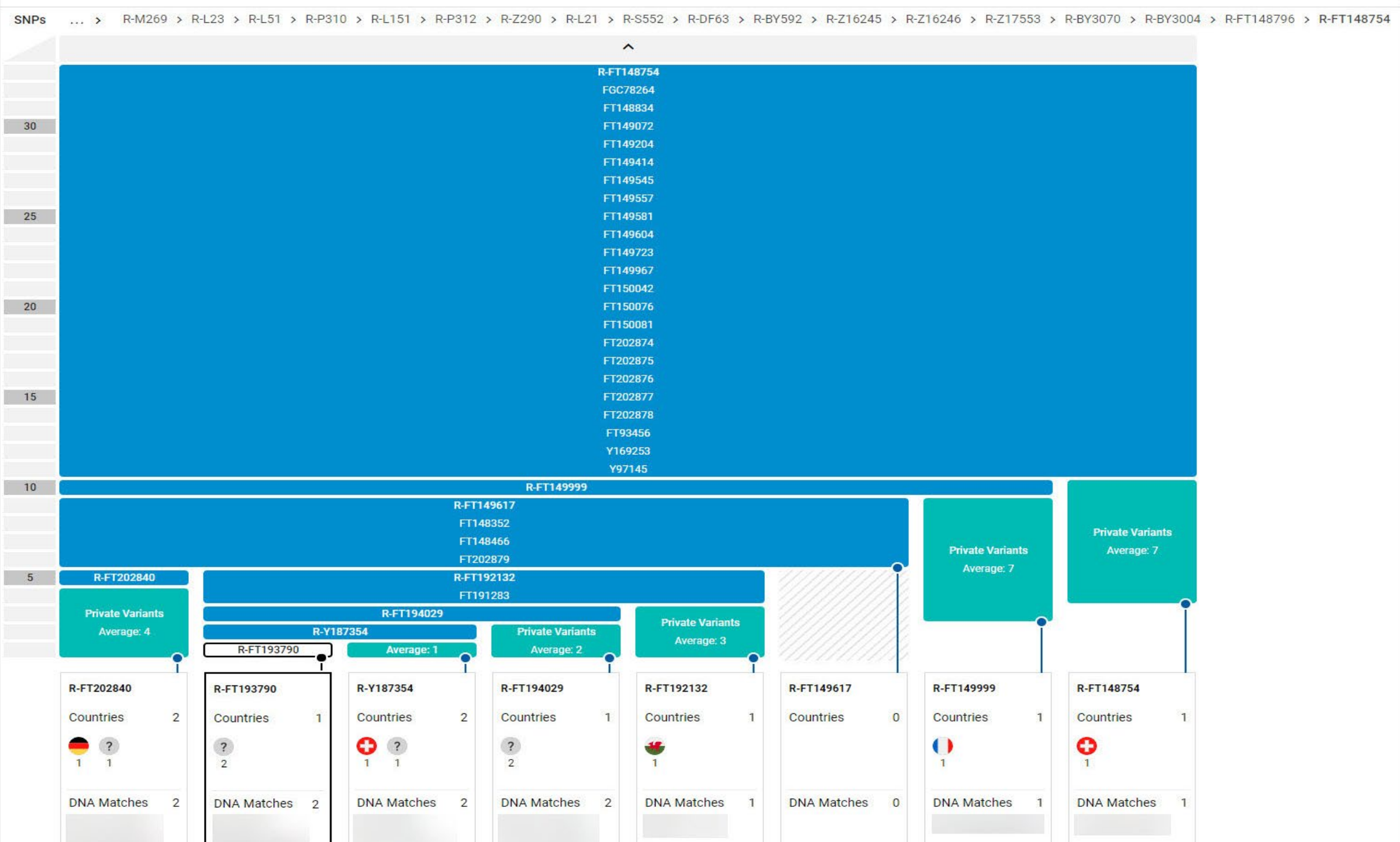
- FIRST – a SHORT discussion of Ethnicity Estimates
  - Ethnicity Estimates are fuzzy – BUT - DNA matches are definitive!
  - ALL of your atDNA matches are in your tree!
- atDNA tests from most providers are ~$100, less during a sale.
- 22 chromosome pairs generally busted up into varying segments inherited from each parent. Each non-twin child gets a different 50/50 mix.
- ~25% from each G-parent, ~12.5% from each GG-parent, etc.
- Amounts of shared atDNA are measured in centiMorgans : cM
- So - How often do more distant relatives share atDNA?
- See the statistics here: HAPI-DNA and ISOGG
  - So atDNA only produces matches for roughly 4-8 generations ago.
- ISOGG atDNA test comparison chart

atDNA transfers possible between various vendors



Y-DNA : Father to son only

- Chromosome 23 is either X+X (female) or X+Y (male)
- The Y chromosome passes from father to son duplicated almost exactly
- BUT – approximately every few generations a single mutation (SNP) occurs and is passed on to all subsequent generations. These SNPs are then unique to that male branch henceforth – a new haplogroup.
- STR (Short Tandem Repeat) DNA stuttering patterns are also passed on and useful but not as stable and can flip back and forth.
- SO : Y-DNA is trackable by males on their paternal line through all time!
- BUT SNPs do not occur often enough to distinguish every generation.
- My most recent SNP is R-FT193790 with this geographic path
- Y-DNA is powerful for paternal-line surname type studies and proofs.


SNPs ... > R-M269 > R-L23 > R-L51 > R-P310 > R-L151 > R-P312 > R-Z290 > R-L21 > R-S552 > R-DF63 > R-BY592 > R-Z16245 > R-Z16246 > R-Z17553 > R-BY3070 > R-BY3004 > R-FT148796 > R-FT148754
R-FT148754
FGC78264
FT148834
FT149072
FT149204
FT149414
FT149545
FT149557
FT149581
FT149604
FT149723
FT149967
FT150042
FT150076
FT150081
FT202874
FT202875
FT202876
FT202877
FT202878
FT93456
Y169253
Y97145
30
25
20
15
10
5
R-FT149999
R-FT149617
FT148352
FT148466
FT202879
Private Variants
Average: 7
Private Variants
Average: 7
R-FT202840
Private Variants
Average: 4
R-FT192132
FT191283
R-FT194029
R-Y187354
R-FT193790
Average: 1
Private Variants
Average: 2
Private Variants
Average: 3
R-FT202840
Countries 2
1 1
DNA Matches 2
R-FT193790
Countries 1
2
DNA Matches 2
R-Y187354
Countries 2
1 1
DNA Matches 2
R-FT194029
Countries 1
2
DNA Matches 2
R-FT192132
Countries 1
1
DNA Matches 1
R-FT149617
Countries 0
DNA Matches 0
R-FT149999
Countries 1
1
DNA Matches 1
R-FT148754
Countries 1
1
DNA Matches 1

X-DNA : from mother or father

- A female receives two X chromosomes:
  - One X from her mother and one X from her father
- A male receives one X chromosome and one Y chromosome:
  - The X from his mother and the Y from his father

This results in a different X DNA inheritance pattern for males and females.

X-DNA results are reported by 23andMe, FamilyTree DNA and GEDmatch

Mitochondrial DNA : mtDNA from mother to child

- mtDNA is a circular chromosome in the cytoplasm of the cell
- It is in greater abundance in our cells than the 23 nuclear chromosomes so is more available in ancient remains.
- Like Y-DNA It is duplicated almost exactly from mother to child,
- So is trackable by all on their maternal line through all time!
- But the mtDNA SNP mutation rate is considerably slower than Y-DNA so it does not result in unique identifying mutations as frequently through time. Fewer people have taken a mtDNA test, yet I have over 200 exact matches with me at FTDNA.
- So mtDNA is often only useful for ruling someone out of a maternal line, unless your mtDNA haplogroup is unusual.

AncestryDNA

- Largest pool of atDNA testers
- Does not allow importing of DNA data from other companies.
- So if cousin DNA matching is desired, test first at AncestryDNA
- Establishing family tree at Ancestry and linking known DNA matches to that tree will result in the very useful "Thru Lines" feature. But be careful of connections resulting from faulty trees.
- When you buy an Ancestry DNA test you do not have to get an Ancestry data subscription.
- AncestryDNA YouTube videos

23andMe

- 23andMe has the second largest pool of DNA testers
- Like AncestryDNA, 23andMe does not allow importing of DNA data
  - So you might also want to test at 23andMe if needing more matches
- Allows you to see how much DNA your matches share with each other!
- 23andMe has a nice automatic tree generator for DNA testers
- 23andMe has considerable health-related DNA analysis
- 23andMe displays X-DNA matches with X-chromosome data
- 23andMe YouTube video collection (few tutorials)

Family Tree DNA : FTDNA

- FTDNA is one of the oldest consumer DNA test companies
- It provides atDNA, X-DNA, Y-DNA, mtDNA testing and analysis.
- If you want a Y-DNA or mtDNA test you should use FTDNA
- Note that these two tests are more costly – wait for a sale.
- FTDNA displays X-DNA matches with X-chromosome data
- Family Tree DNA YouTube video collection

MyHeritage DNA

- MyHeritage DNA supports more out-of-USA testers than others
- One paid account allows importing and analysis of multiple DNA kits
- Allows you to see how much DNA your matches share with each other!
- MyHeritage has an excellent collection of DNA analysis tools:
  - Triangulation, AutoClusters, Tree Consistency Checker
- The Auto-Cluster feature is useful for grouping DNA matches
- MyHeritage YouTube video collection

GEDmatch website

- GEDMatch accepts data imports from most DNA test companies.
- Has a range of free DNA analysis tools:
  - numerous ethnicity/admixture algorithms
  - X-DNA tools, "are your parents related" and many more
  - People who match both or 1 of 2 kits
- A large range of many advanced tools for a modest cost
  - Triangulation, Lazarus…
- Allows storage and analysis of multiple DNA kits: "MKA"
- Allows analysis of any publicly posted DNA kit.

Identifying DNA Matches

- Always start by properly placing your known DNA matches.
- Then generally assign unknown matches to one of four proper grand-parents: 2nd and 3rd cousins the best for this.
  - Find/favor matches <250cM for this step
  - Find & assign the shared matches with these 2nd & 3rd cousins.
  - This is commonly called the Leeds Method.
- auto-clustering tools are at MyHeritage and GEDmatch
- Your goals may dictate whether you should test at more than one company. You need more matches to place a mystery match

Initial analysis – then specify your goal(s)

- Find new cousins - identify and place unknown matches
  - Some matches may reveal a Misattributed Parental Event (MPE):
    - You may have a (close) match whose tree conflicts with yours.
    - A DNA match posts a tree who has a large missing branch
- Find the bio-parent(s) of an individual
  - Who was my bio-father, or bio-parents?
  - Who was the father of my father, etc. ?
- What is a person's (or your) paternal line? (use Y-DNA)
- What is a person's (or your) maternal line? (use mtDNA)

Learn to find living people. Why?

- When utilizing DNA matches it is normal to have to build a family tree for the many matches that have no tree or an abbreviated tree. You need to determine how they connect to you.
- When proving a mystery connection, you may need to ask a living individual to do a DNA test for you : Targeted Testing
- BeenVerified.com $29/month
- Spokeo.com $83/year

DNA Painter website

- Shared centiMorgan Project – tutorial
- Chromosome segment painter – tutorial video
- What are the Odds - tutorial video

The case of Jane Doe – conventional logic

- "Jane Doe" contacts me on MyHeritage about her 411cM match with my maternal-side 1st Cousin. Jane also shares 486 cM with me.
  - This amount suggests that Jane is likely a 1C1R to my cousin and myself.
  - I.E. Jane is likely the child of one of my 1st Cousins.
- Jane clearly has DNA from my mother's side of the family
- Jane cooperates, asking for help – letting me see her matches.
- I sort her matches into four grandparent groups
- Jane's matches from one parent are from the mother who raised her.
- Matches from her other parent (father) are from my mom's side:
  - So Jane's father appears to be one of my (male) 1st cousins.
- We need more matches to find where Jane connects to my mom's side.
- I ask Jane to test with Ancestry.com and 23andMe (we each pay for one)

The case of Jane Doe – continued A

- Jane Doe was born 1953. Both of the parents who raised her are deceased.
- There are eight siblings in my mom's family
  - From those eight: I have 21 male 1st Cousins on my mother's side!
- My brother and I are too young to father a child in 1953 and more significantly we would share more DNA with Jane if either were her father.
- Jane's 23andMe results add four matches coming thru my mom's siblings.
- Branches of five more of my mom's siblings are ruled out either because the males are too young to father a child, or the four new DNA matches share too little DNA to indicate fathers from those branches.
- In addition, the fact that Jane and I share X-DNA (23andMe) says that Jane's father must have a DNA path through a female/aunt of mine.
- Two branches of my mother's sisters remain to be investigated for possible DNA matches. One branch with 7 males, the other with 3 males.

The case of Jane Doe – continued B

- Jane's results come in from Ancestry.com:
- The branch with 3 males has no matches - two males old enough.
- The branch with 7 males has two matches at Ancestry.com.
- In the branch of 7 males, four are too young to father Jane.
- The oldest of the 7 males has a grand-daughter who tested and shares 442cM DNA with Jane, too little to be Jane's niece.
- A daughter of another male in this line shares 1096cM with Jane:
  - Likely not a half-sibling but a 1st Cousin to Jane.

The case of Jane Doe – continued C

- In one branch, we are down to two males being the father of Jane.
- One of the two likely father candidates (now deceased) had possible physical proximity to Jane's mother at the time of Jane's conception.
- I contact the eldest male in this branch confiding only in him.
- He reports that the proximate brother (deceased) did in fact have a surprise child:
  - A male (born 1958) known and welcomed to the family – only his name is provided.
  - I suggest that a second (female) child is possible, the idea is rejected.
- Via FaceBook and BeenVerified we locate the surprise male.
- Jane writes a hand-written letter to him suggesting the half-sister idea.
- He ultimately is willing to do a sibling DNA test but only through a private company.
- He purchases and manages a sibling test (two kits) through paternityusa.com

The case of Jane Doe – Concluded

- Jane Doe tests as a half-sibling. The father of Jane is thus determined.
- Note that in this case even Jane's mother may not have known who the father of Jane was because Jane was conceived within a few weeks of the marriage of her parents.

- The DNAPainter WATO tool is fabulous for this sort of problem:
  - Where might a mystery DNA match fit in a tree?
  - It performs much of the process of elimination automatically.
  - It computes placement probabilities by weighing amounts of expected shared DNA for various scenarios with amounts of actual shared DNA from testers in the tree that you provide.

Summary of some useful resources for Genetic Genealogy:

- International Society of Genetic Genealogy
- DNAPainter.com
- DNA-explained.com by Roberta Estes
- Legacy Family Tree Webinars on DNA - $10/month
- Family History Fanatics YouTube videos
- David Vance (especially Y-DNA) YouTube videos
- Family Locket Research Like a Pro videos and podcast

Conclusion

- Get HELP any Tuesday 2-4pm at the Falmouth Public Library.
- FGS monthly talks are FREE! (2nd Saturday of month)
- NERGC – Springfield Mass – May 3-6, 2023 https://nergc.org/
- Ruth Marie Terry – "Lady of the Dunes" – at FamilySearch.org

https://falgen.org Resources -> Links