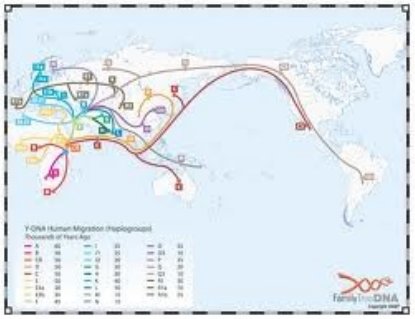


# Genetic Genealogy

## "Rules and Tools"

**Baltimore County Genealogical Society**

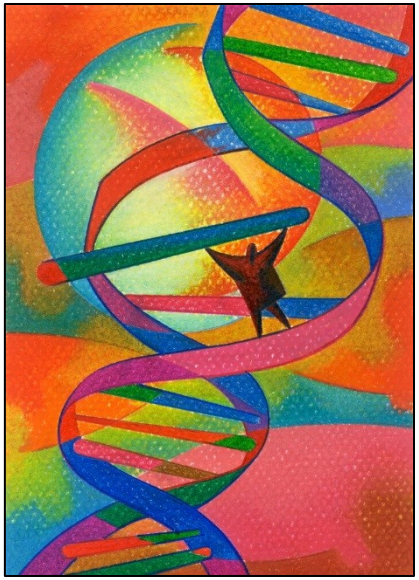
March 25, 2018

Andrew Hochreiter

# I am NOT this guy!

# Genealogy's Newest Tool

- **Genealogy research:**
  - **Study of Family History**
  - **Identifies Kinships & Pedigrees**
  - **Traditional Research Tools include:**
    - **Records & Documentation**
    - **Oral Interviews**



- **Genetic Genealogy is latest tool**
  - **Genetic genealogy** is the application of genetics to traditional genealogy.
  - Genetic genealogy uses genealogical **DNA testing** to determine the level and type of the **genetic relationship** between individuals

# Use of DNA in Genealogy

- **DNA tests** can be used by genealogists to:
  - **Link specific individuals** - Test to see whether you and another person may be cousins who descend from a common ancestor
  - **Prove or disprove the ancestry of people sharing the same last name (or NOT)** - Test to see if males carrying the same surname are related to each other
  - **Map the genetic origins of large population groups** - Test to see what geographical origins or ancestry you have
  - **Determine Admixture** – Test to see what Ethnicity percentages you have

# Terri's Golden Rules

- Build a robust tree with records
- Make your tree public
- Test oldest living relatives
- Also siblings, aunt/uncle, 1C, 2C, …
- Test at multiple companies
- Find DNA matches in common with known cousins
- Compare trees & surnames
- Contact matches – help them too
- Validate match's tree with records
- Triangulate DNA segments
- Solve other matches on the same segment
- Keep your tree straight
- Keep your DNA matches straight

# Tools for Success

ancestry

FamilyTreeDNA

23andMe

GEDmatch Tools for DNA and Genealogy Research

The Shared cM Project
August 2017

Blaine T. Bettinger
www.TheGeneticGenealogist.com
CC 4.0 Attribution License

GMP GENOME MATE PRO
A Tool for Managing DNA Comparisons

WikiTree
Where genealogists collaborate

# DNA Results

- **Y-DNA**
  - STR Values (predicts Y Haplogroup)
  - SNP Terminal (confirms Y Haplogroup)
- **Mitochondrial (mtDNA)**
  - Allele Value in rCRS
- **Autosomal (atDNA)**
  - Centimorgans of shared DNA
- **X-DNA**
  - Similar to atDNA: Shared cMs

# What You Get from atDNA

- **Ethnicity & Admixture**
- **Raw Data Results**
- **Relative Connections (Matches)**
  - Relationships back along any Family Tree branch unless shared DNA becomes eliminated
  - When you take a DNA test, you get access to the contact information for anyone else in the database of the company you used who is a genetic relative of yours, usually up to sixth cousin

# Ethnicity & Admixture

- **Ethnicity**
  - Social group that has a common national or cultural tradition. (Different from Race)
- **Admixture**
  - Method of inferring someone's geographical origins based on an analysis of their genetic ancestry.

Sources:
http://www.dictionary.com/, accessed
https://isogg.org/wiki/Admixture_analyses

# Raw Data File

- Download as comma-separated-variable (CSV) file

```
RSID,CHROMOSOME,POSITION,RESULT
"rs3131972","1","742584","TT"
"rs12562034","1","758311","CC"
"rs12124819","1","766409","CT"
"rs11240777","1","788822","AG"
"rs6681049","1","789870","TT"...
```

**RSID** – Provides the Reference SNP cluster (RS) number for the SNP in the NIH dbSNP database.
**CHROMOSOME** – Provides the name of the chromosome where the SNP is located. For an autosomal file, that is 1 through 22. For an X-chromosome file, that is X.

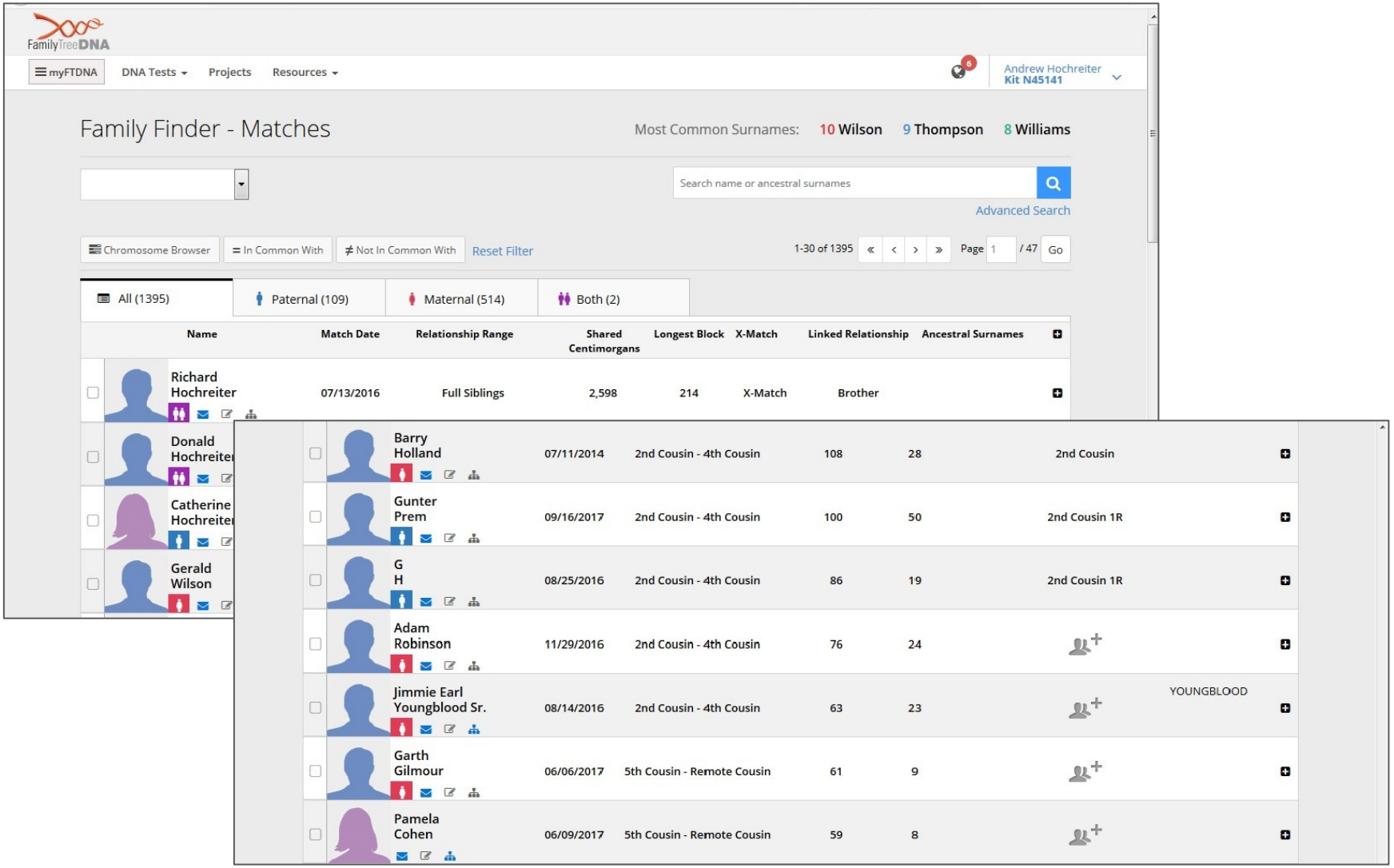
**POSITION** –Provides the specific location on the specified chromosome of the SNP.
**RESULT** – Provides the allele values for the SNP.

| | A | B | C | D |
|---|---|---|---|---|
| **1** | RSID | CHROMOSOME | POSITION | RESULT |
| **2** | rs3131972 | 1 | 742584 | TT |
| **3** | rs12562034 | 1 | 758311 | CC |
| **4** | rs12124819 | 1 | 766409 | CT |
| **5** | rs11240777 | 1 | 788822 | AG |
| **6** | rs6681049 | 1 | 789870 | TT |

# Relationship Matches

- **FTDNA**
  - Family Finder Matches
- **23andMe**
  - DNA Relatives
- **AncestryDNA**
  - DNA Matches
  - DNA Circles
- **MyHeritage**
  - Shared DNA Matches

# Matches Page

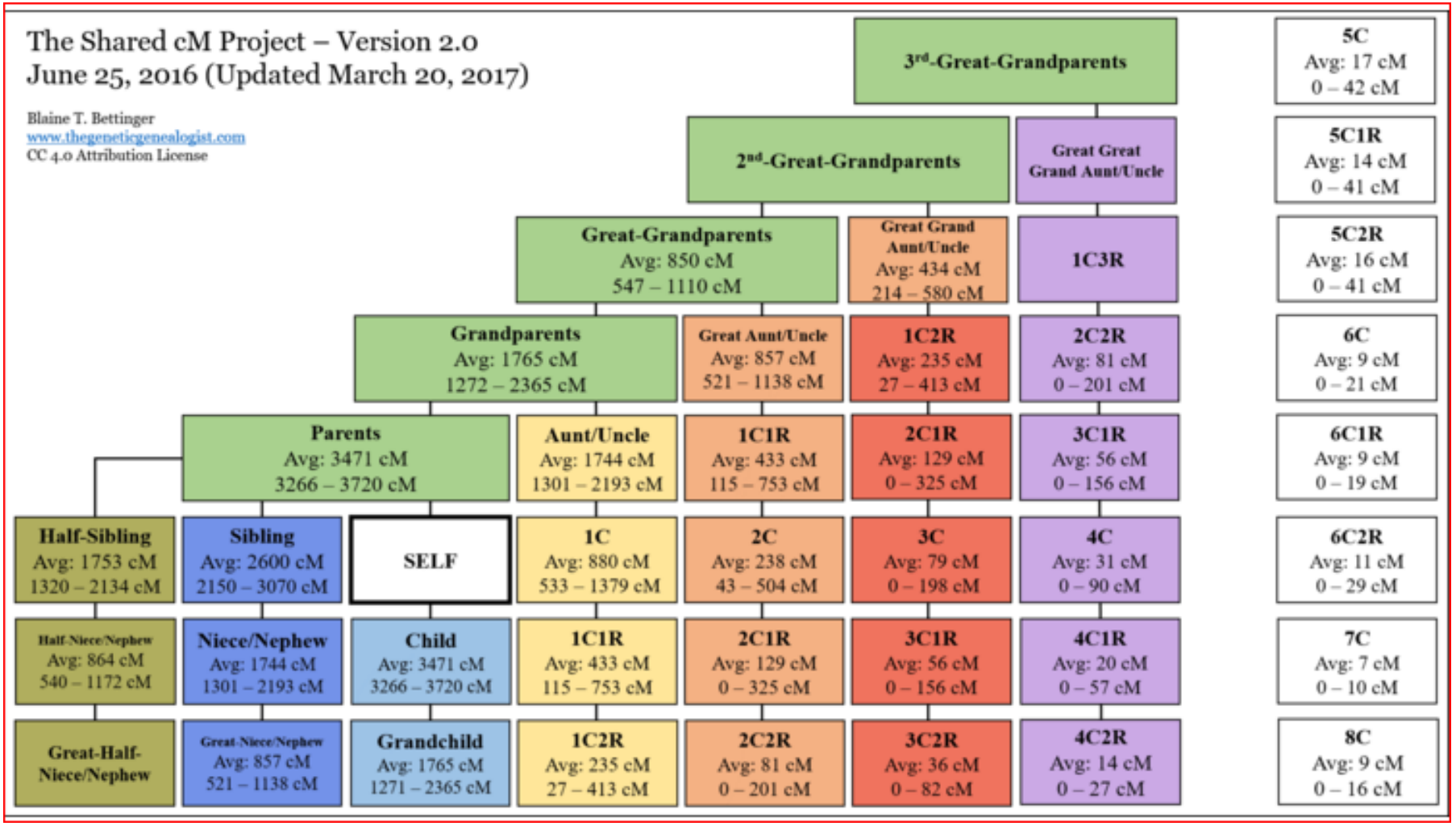


# Measuring atDNA

- atDNA is measured in shared **centiMorgans (cMs) & SNPs**
  - 1 cM: about a million base pairs on average
  - Denotes the size of matching DNA segments
  - Can measure a segment length on a chromosome or summed as the total cMs shared by two relatives
  - **Rules of Thumb for a match**:
    - Min 7cM total shared
    - Min 500 SNPs (identical markers)
    - Min 5 cM segment

Source: https://isogg.org/wiki/CentiMorgan

# Predicting Relationships Average cMs and Range




Source: https://isogg.org/wiki/Autosomal_DNA_statistics

# Test Companies & Databases

| Company | 23andMe | Family Tree DNA's Family Finder test | Ancestry.com's AncestryDNA test | MyHeritage |
|---|---|---|---|---|
| Primary purpose for which the test was designed | Medical<br>Genealogical<br>Personal Ancestry | Genealogical<br>Personal Ancestry<br>(Autosomal only) | Genealogical<br>Personal Ancestry<br>(Autosomal only) | Genealogical<br>Personal Ancestry<br>(Autosomal |
| International product availability | 56 countries (health reports only available in selected countries). | Worldwide | USA, UK, Ireland, Australia, NZ and Canada. Launched in 29 countries in 2016. | All countries except France, Poland, and Israel, as well the state of Alaska |
| Number of people in the database (as of 7 Mar 2018) | **5,000,000** | **About 800,000** | **7,000,000** | **1,200,000** |
| Shared matching segments | Yes (if the match is willing to share genomes) | Yes for all matches | No | Yes for all matches |
| Chromosome browser | Yes, using the DNA comparison tool associated with DNA Relatives | Yes, using the Chromosome Browser tool | No | Yes, on the Review DNA Match page |
| # SNPs in each matching segment | Yes | Yes | No | Yes |
| Matching segments of X chrom reported | Yes | Yes | No | No |

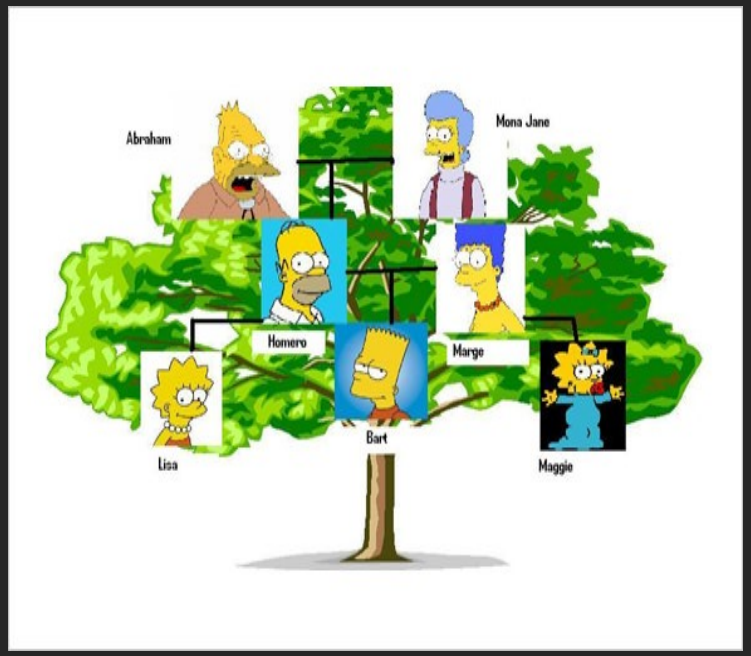
Source: https://isogg.org/wiki/Wiki_Welcome_Page, accessed 3/22/2018

# FTDNA's Databases

As of March 22, 2018, the Family Tree DNA database has 951,333 records. Total numbers include transfers from the Genographic Project and resellers in Europe and Middle East. We also have:

- 9,969 Group Projects
- 562,208 unique surnames
- 657,800 Y-DNA records in the database
- 338,357 25-marker records in the database
- 316,898 37-marker records in the database
- 167,368 67-marker records in the database
- 293,533 mtDNA records in the database
- 133,803 FGS records in the database

Source: https://www.familytreedna.com/why-ftdna.aspx, accessed 3/22/2018

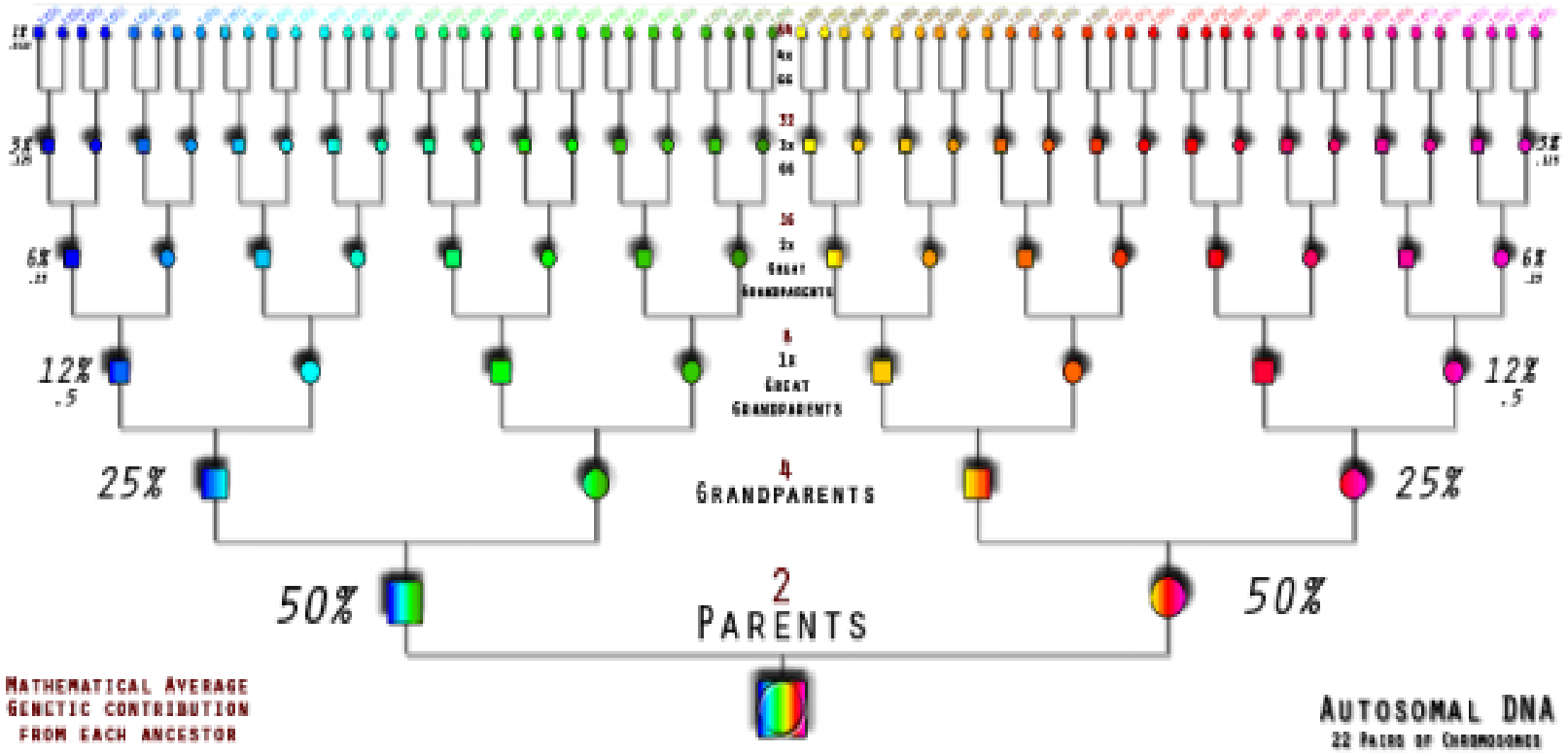



# Family Trees

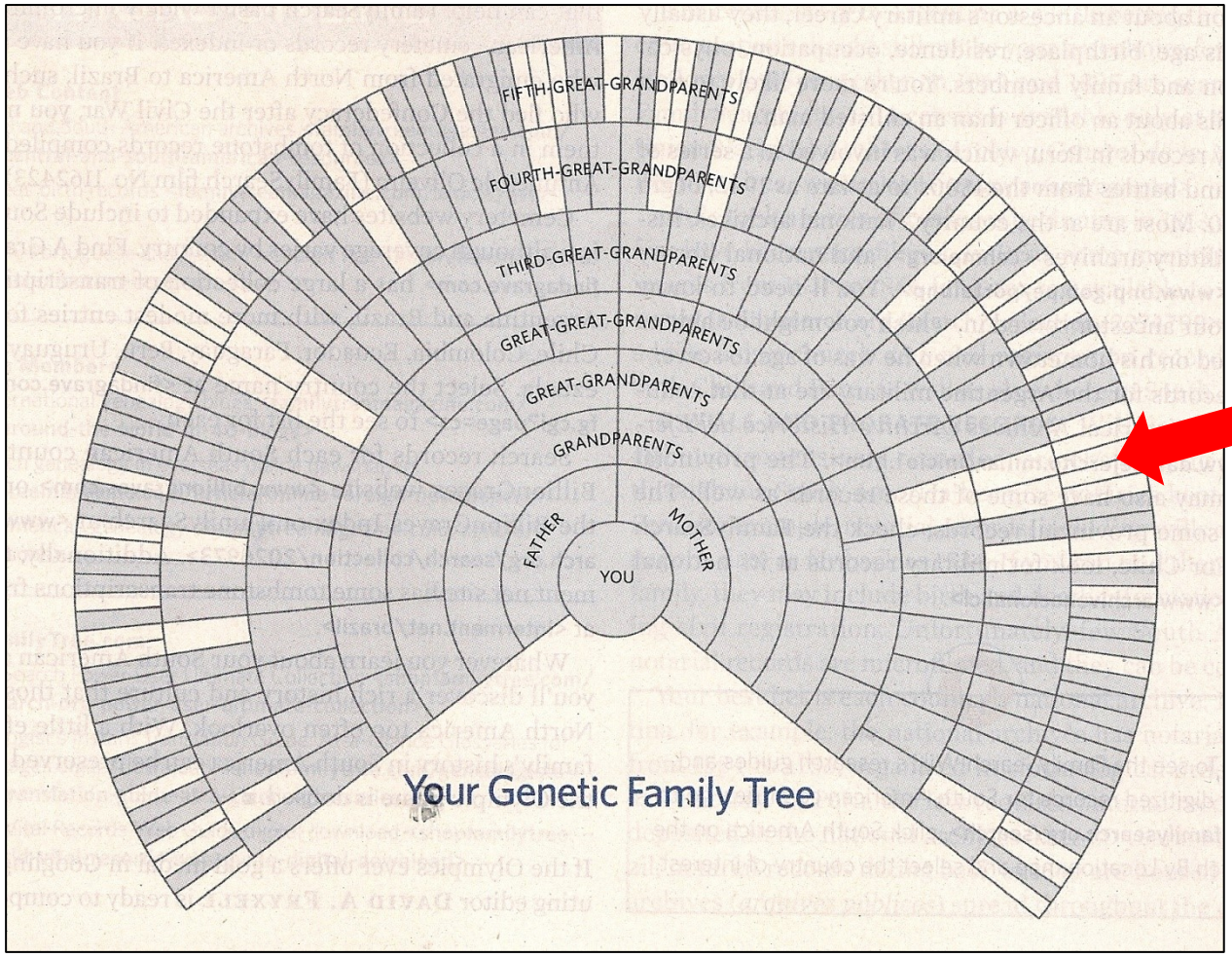
- P
- Make readily accessible to Matches (when they are in research mode)
- Take advantage of Company Analysis Tools
  - 23andMe: Birth places
  - Ancestry: Activates Key Features (DNA Circles)
  - FTDNA: Fill in Surnames/Locations Tab
  - MyHeritage: Smart Matching highlights Overlap
- Identify collateral lines for future testing
- If concerned, Post Skeleton Family Tree
  - NOT just you and your parents!
- **Rewards are directly related to Sharing**

# Your 2 Family Trees

**Genealogical Tree**: all your ancestors
**Genetic Tree**: ancestors whose DNA you inherited
Not all your ancestors will show up in your DNA



# Genetic Tree Subset




Ancestors who "drop off" the Genetic Tree

**Your Genetic Tree is a sub-set of your Genealogical Tree**
**Siblings have the same Genealogical Tree but different Genetic Trees**

# Detectable DNA by Company

| Relationship | 23andMe | AncestryDNA | Family Tree DNA Family Finder | Average % of DNA inherited from ancestor |
|---|---|---|---|---|
| First cousins | 100% | 100% | 100% | 25% |
| Second cousins | 100% | 100% | >99% | 12.5% |
| Third cousins | 89.7% | 98% | >90% | 6.25% |
| Fourth cousins | 45.9% | 71% | >50% | 3.13% |
| Fifth cousins | 14.9% | 32% | >10% | 1.56% |
| Sixth cousins | 4.1% | 11% | Remote (< 2%) | 0.78% |
| Seventh cousins | 1.1 | 3.2% | | 0.39% |
| Eighth cousins | 0.24 | 0.91% | | |
| Ninth cousins | 0.06% | | | |
| Tenth cousins | 0.002% | | | |

Source: https://isogg.org/wiki/Cousin_statistics, accessed 3/21/2018.

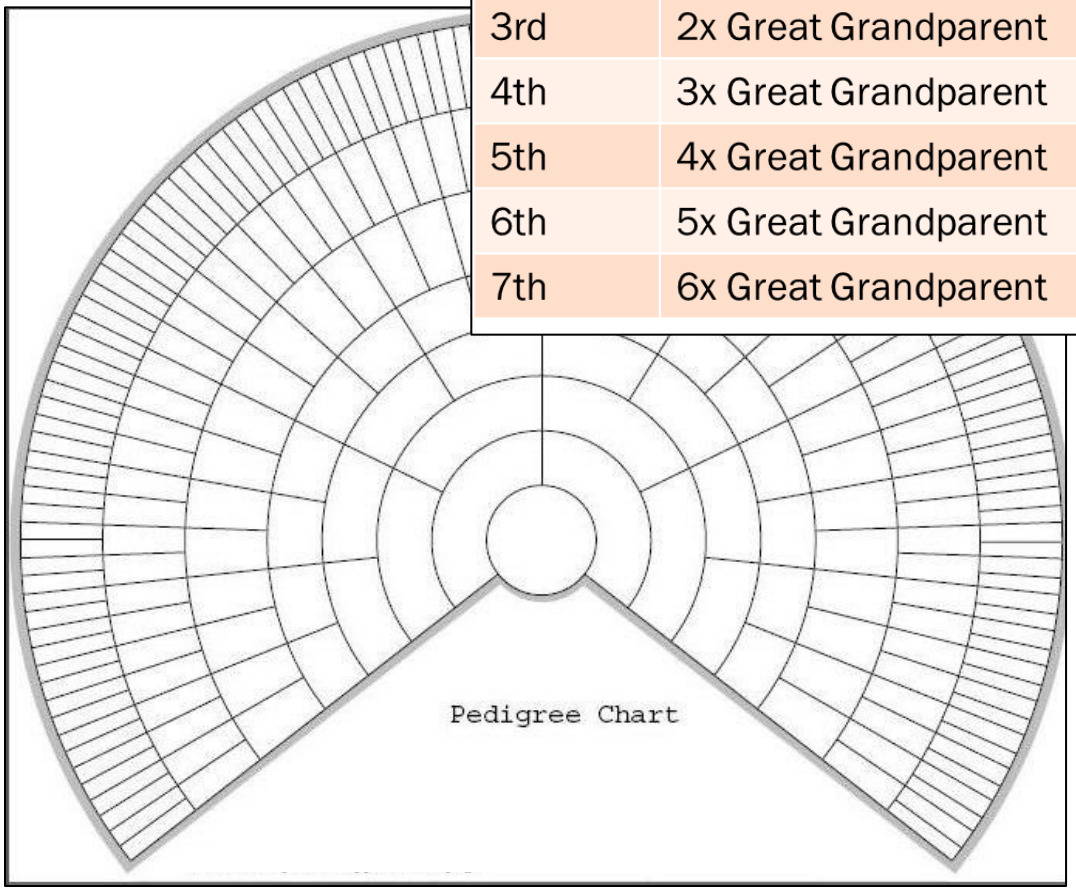
# DNA % from Ancestors

| Generation | Matches | 39By Generation | | | | |
|---|---|---|---|---|---|---|
| | | Total # of Possible Ancestors | Total # of Known Ancestors | Total % of Known Ancestors | Total % of Unknown Ancestors | Average % of DNA inherited from ancestor |
| **Grandparent** | 1st Cousin | 4 | 4 | 100 | 0 | 25% |
| **G-Grandparent** | 2nd Cousin | 8 | 8 | 100 | 0 | 12.5% |
| **2G-Grandparent** | 3rd Cousin | 16 | 14 | 87.5 | 12.5 | 6.25% |
| **3G-Grandparent** | 4th Cousin | 32 | 28 | 87.5 | 12.5 | 3.13% |
| **4G-Grandparent** | 5th Cousin | 64 | 50 | 78.1 | 21.9 | 1.56% |
| **5G-Grandparent** | 6th Cousin | 128 | 77 | 60.2 | 39.8 | 0.78% |

Source: Bettinger and Wayne, *Genetic Genealogy in Practice* (Arlington, VA: National Genealogical Society, 2016), 98, 182.

# Family Tree Exercise

| Cousin | MRCA | # | Terri | Sylvia | Andy | You? |
|---|---|---|---|---|---|---|
| 1st | Grandparent | 4 | 4 | 4 | 4 | |
| 2nd | Great Grandparent | 8 | 8 | 8 | 8 | |
| 3rd | 2x Great Grandparent | 16 | 16 | 14 | 16 | |
| 4th | 3x Great Grandparent | 32 | 28 | 26 | 25 | |
| 5th | 4x Great Grandparent | 64 | 34 | 46 | 23 | |
| 6th | 5x Great Grandparent | 128 | 21 | 54 | 11 | |
| 7th | 6x Great Grandparent | 256 | 18 | 55 | 8 | |



# Define Your Goals

- **Example Testing Goals**
  - Reveal ethnicity estimates
  - Connect with cousins (share research, swap information)
  - Check research for accuracy (prove or disprove relationships)
  - Break Brick Walls/Family mysteries
  - Discover new branches not found in regular research
  - Identify origins of ancestors
  - Determine shared surnames are genetically related
  - Reconstruct ancestor genome
  - Find biological relatives (adoptees, half-relationships)

Even though ethnicity estimates get a great deal of attention, the most genealogically valuable part of your DNA test results is the **match list** which connects you to others based on your shared DNA results.

# Testing Strategies

- Decide How to meet your Goals
- Decide Who you will test
  - Test oldest relatives (
  - Test relatives who do not have both parents living
- Decide Where you will test
  - Test or transfer to other companies
- Decide What test you need

# Optimize Fishing Holes

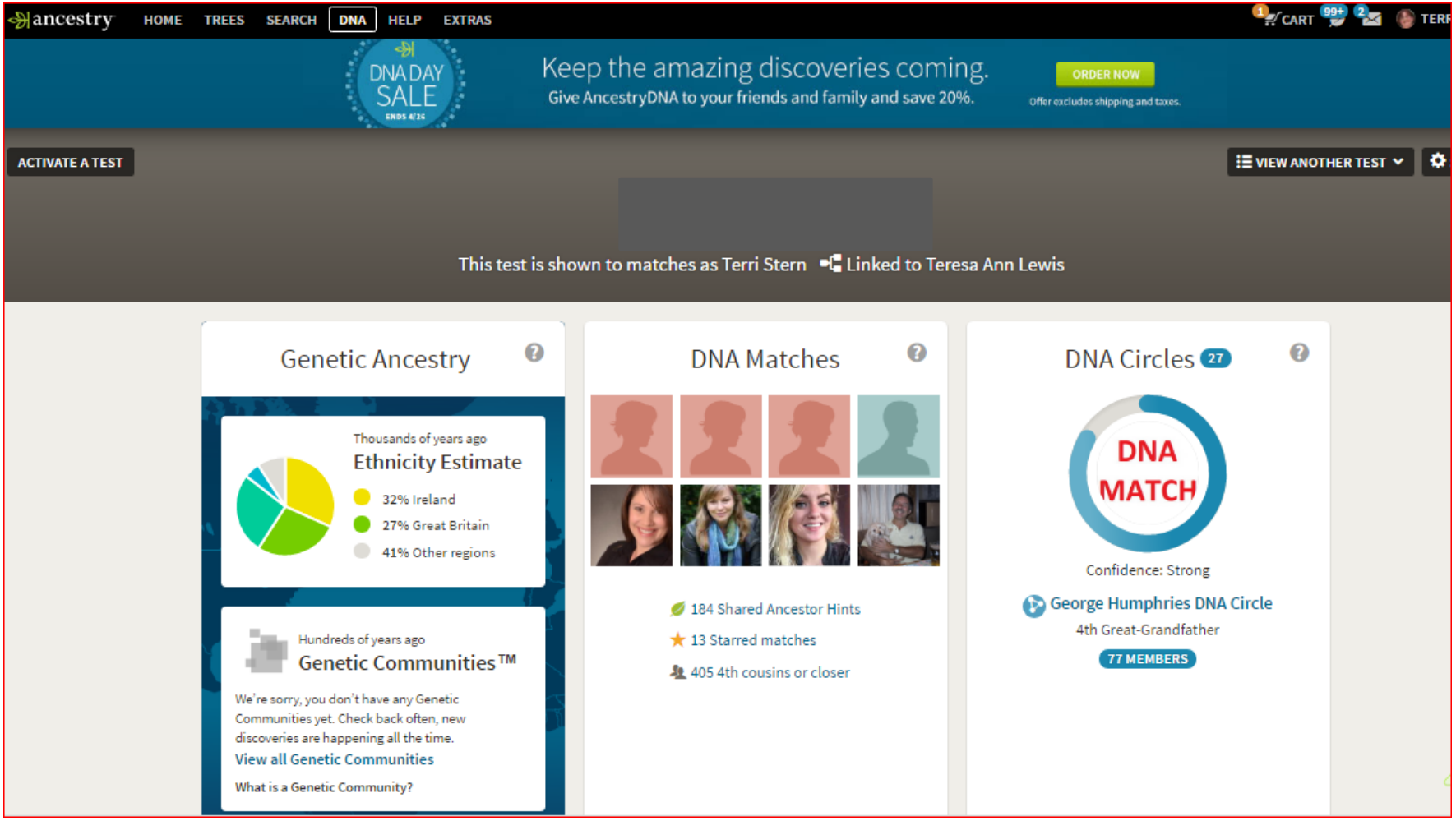
- **Example:**
  - Test at Ancestry first
  - Raw data transfers to FTDNA, MyHeritage, & GEDmatch
  - Ancestry & 23andMe do not accept other tests
  - Test at 23andMe, Y-DNA, mtDNA, SNP testing, BigY
  - Other: Living DNA

# Steps To Follow

- Use Company tools
- Contact matches
- Transfer results
- Additional testing**
  - Self
  - Test oldest relatives (Choose earliest generation in direct line)
  - Test relatives who do not have both parents living
  - 2nd, 3rd Cousins

**The farther back to the focus ancestral couple, the more test-takers will be needed to obtain an amount of shared DNA evidence.
Random recombination and inheritance may mean some DNA is not shared by all cousins even when test-takers share the common ancestor.

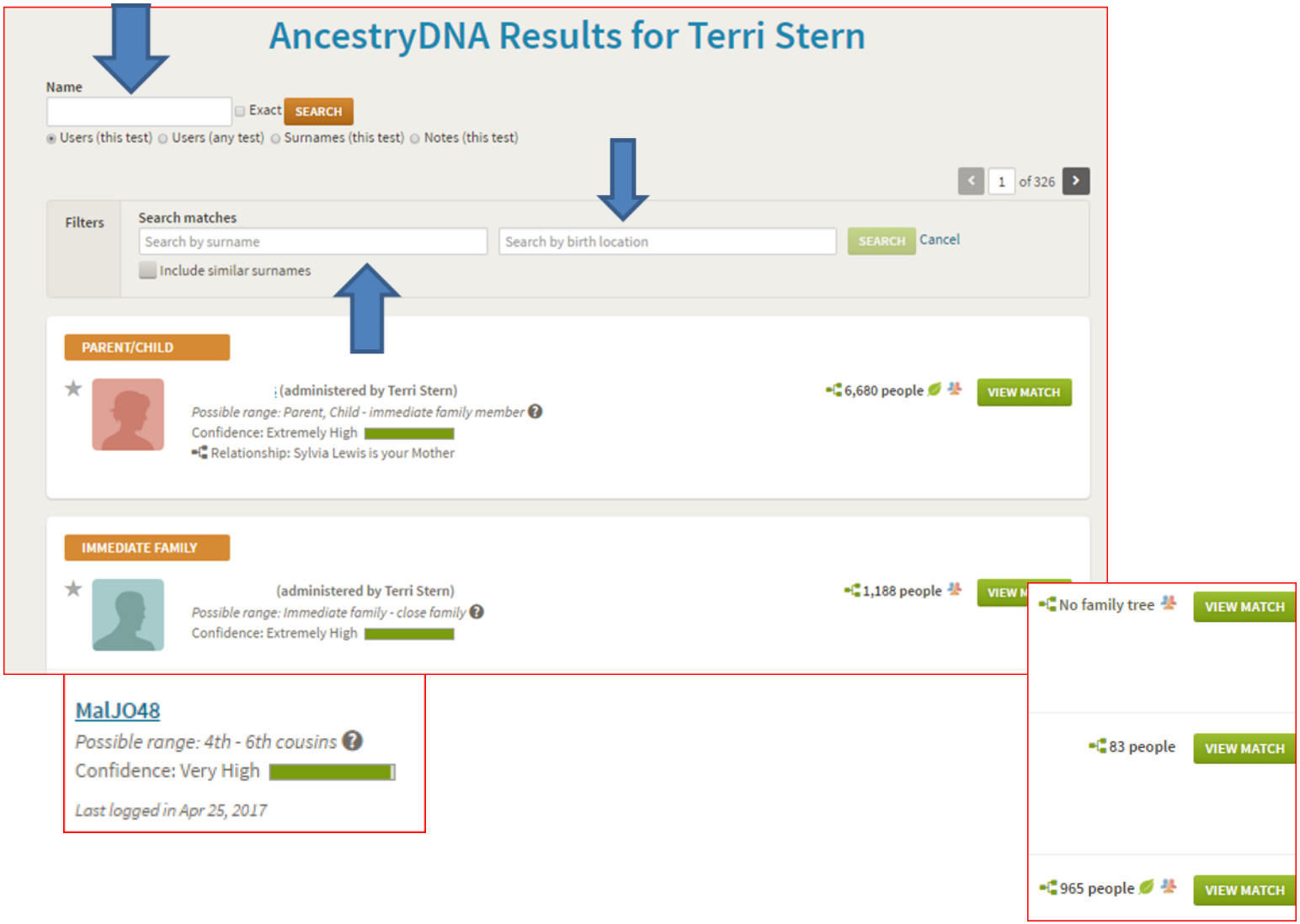
# AncestryDNA



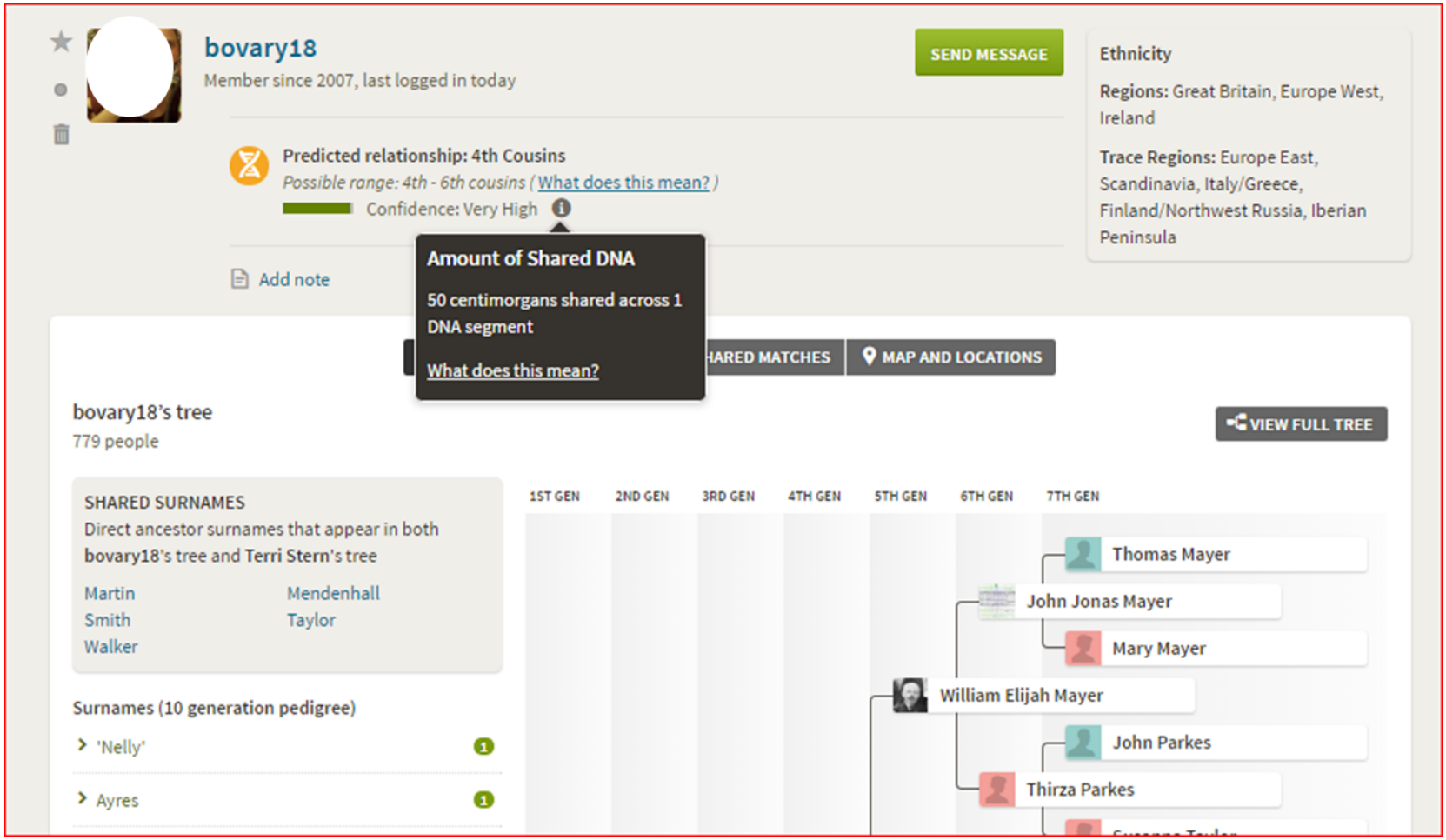
# AncestryDNA Tools

1. Match list
2. Chromosome Browser – none provided
3. Triangulation – none provided
4. Family Trees
5. Automatic identification of a common ancestor
   a. Shaky leaf hints
6. Filters
7. Ethnicity Estimate
8. Genetic Communities
9. DNA Circles
10. Raw Data Download

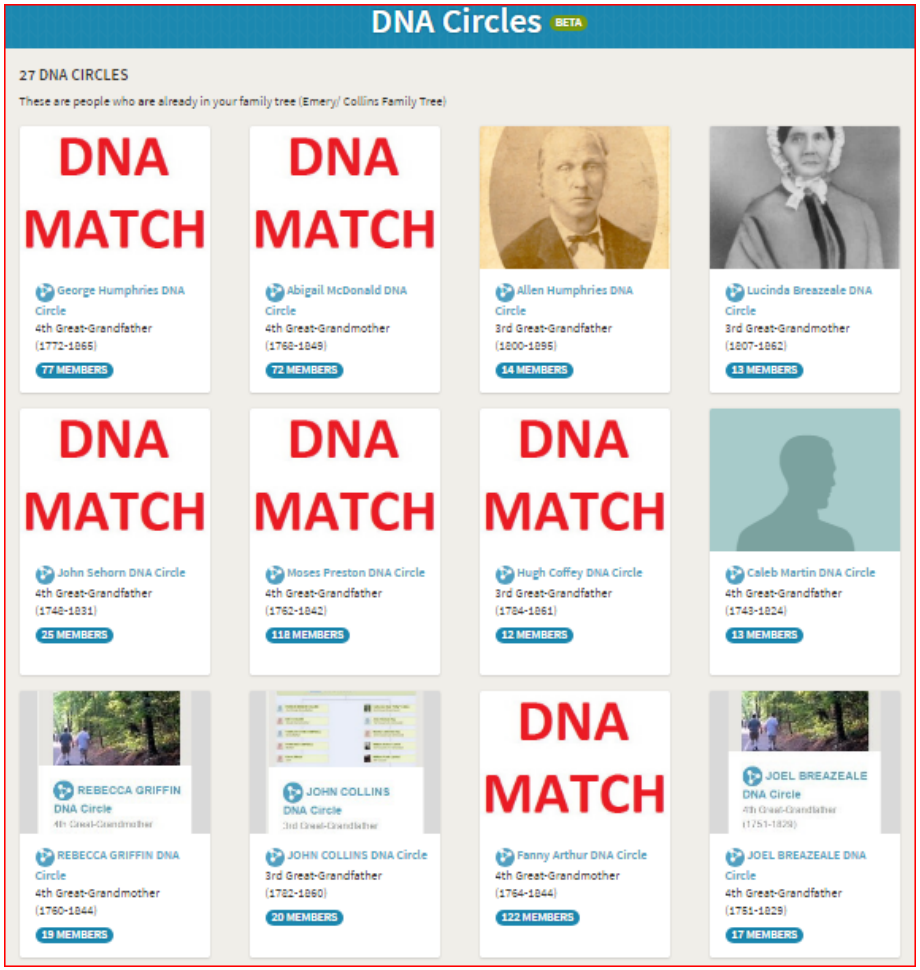
# AncestryDNA: Matches

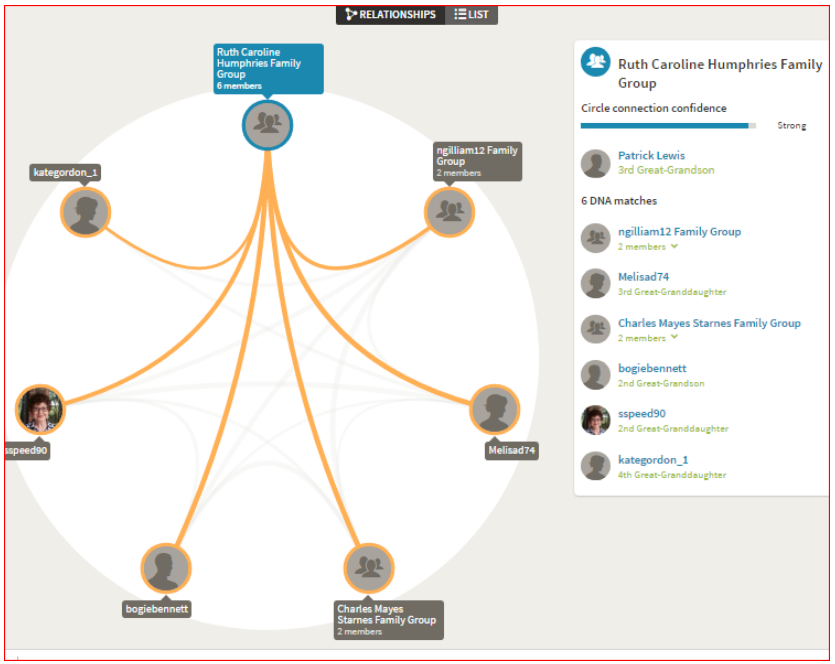


# AncestryDNA: View Match

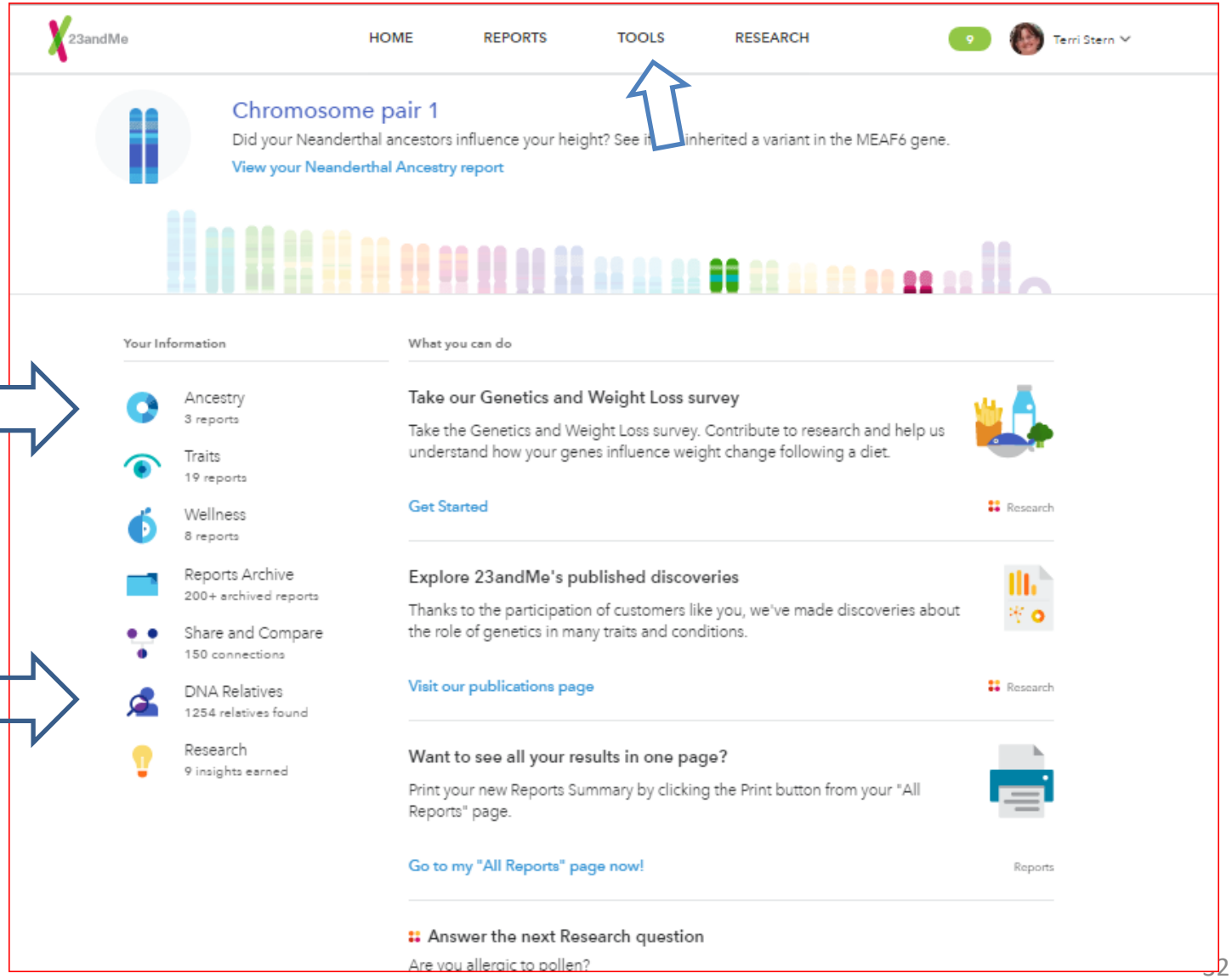


# DNA Circles

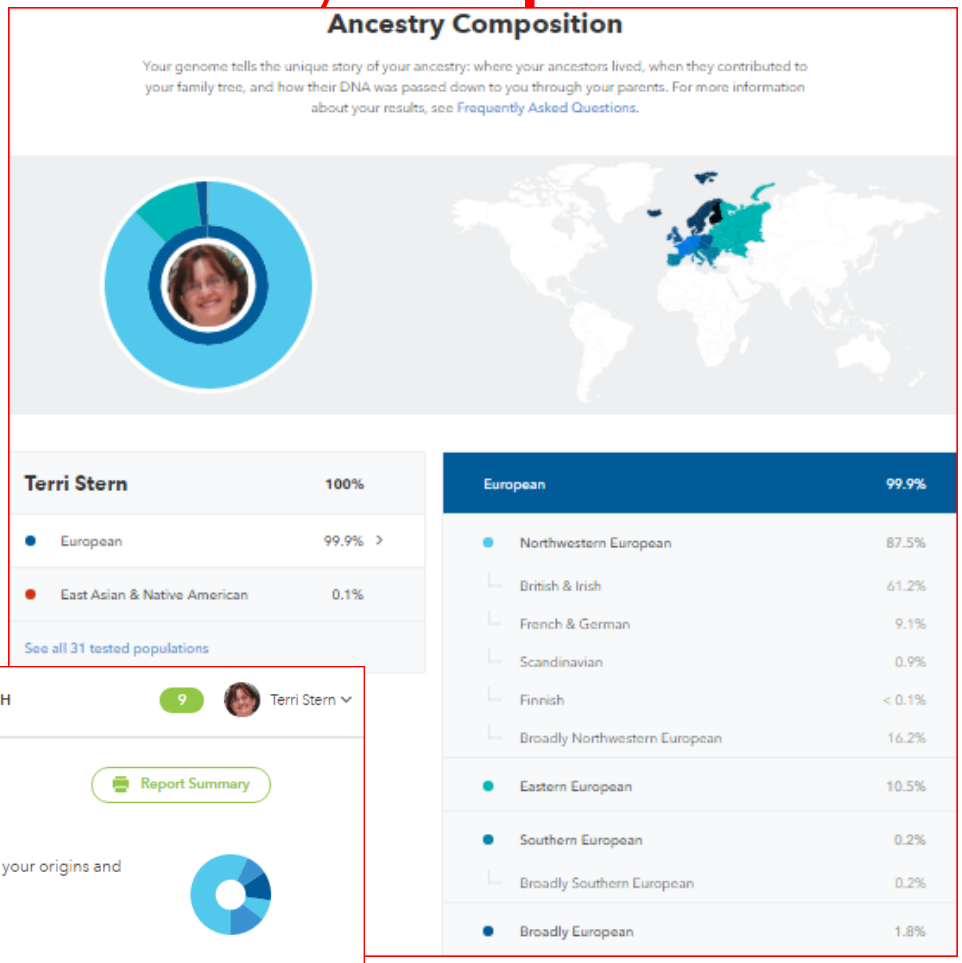

DNA Circles BETA
27 DNA CIRCLES
These are people who are already in your family tree (Emery/ Collins Family Tree)
DNA MATCH
George Humphries DNA Circle
4th Great-Grandfather
(1772-1865)
77 MEMBERS
DNA MATCH
Abigail McDonald DNA Circle
4th Great-Grandmother
(1768-1849)
72 MEMBERS
Allen Humphries DNA Circle
3rd Great-Grandfather
(1800-1895)
14 MEMBERS
Lucinda Breazeale DNA Circle
3rd Great-Grandmother
(1807-1862)
13 MEMBERS
DNA MATCH
John Sehorn DNA Circle
4th Great-Grandfather
(1748-1831)
25 MEMBERS
DNA MATCH
Moses Preston DNA Circle
4th Great-Grandfather
(1762-1842)
118 MEMBERS
DNA MATCH
Hugh Coffey DNA Circle
3rd Great-Grandfather
(1784-1861)
12 MEMBERS
Caleb Martin DNA Circle
4th Great-Grandfather
(1743-1824)
13 MEMBERS
REBECCA GRIFFIN DNA Circle
REBECCA GRIFFIN DNA Circle
4th Great-Grandmother
(1760-1844)
19 MEMBERS
JOHN COLLINS DNA Circle
JOHN COLLINS DNA Circle
3rd Great-Grandfather
(1782-1860)
20 MEMBERS
DNA MATCH
Fanny Arthur DNA Circle
4th Great-Grandmother
(1764-1844)
122 MEMBERS
JOEL BREAZEALE DNA Circle
JOEL BREAZEALE DNA Circle
4th Great-Grandfather
(1751-1829)
17 MEMBERS

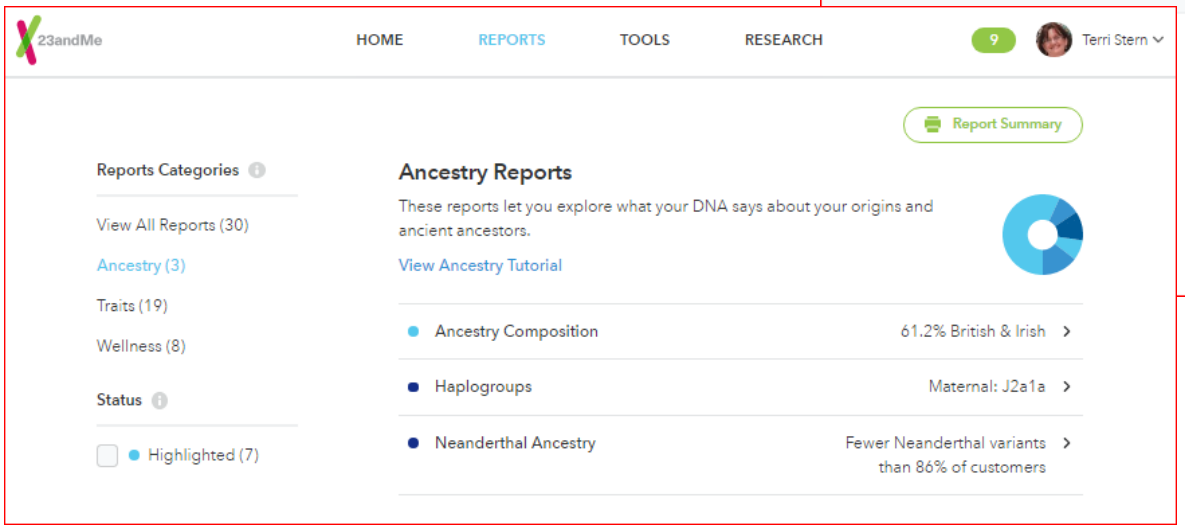

RELATIONSHIPS
LIST
Ruth Caroline Humphries Family Group
6 members
kategordon_1
ngilliam12 Family Group
2 members
sspeed90
Melisad74
bogiebennett
Charles Mayes Starnes Family Group
2 members
Ruth Caroline Humphries Family Group
Circle connection confidence
Strong
Patrick Lewis
3rd Great-Grandson
6 DNA matches
ngilliam12 Family Group
2 members
Melisad74
3rd Great-Granddaughter
Charles Mayes Starnes Family Group
2 members
bogiebennett
2nd Great-Grandson
sspeed90
2nd Great-Granddaughter
kategordon_1
4th Great-Granddaughter

# 23andMe

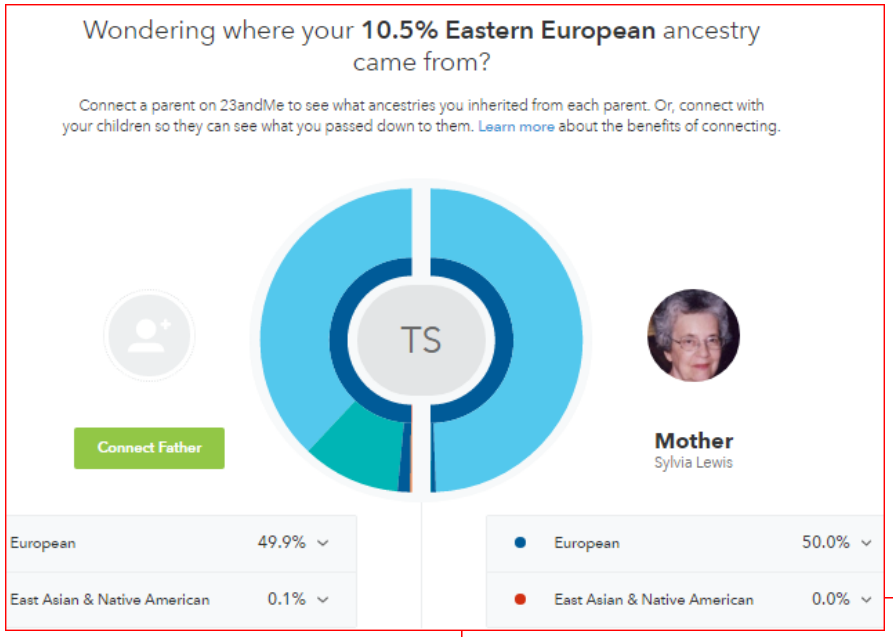

23andMe
HOME
REPORTS
TOOLS
RESEARCH
9
Terri Stern
Chromosome pair 1
Did your Neanderthal ancestors influence your height? See i inherited a variant in the MEAF6 gene.
View your Neanderthal Ancestry report
Your Information
Ancestry
3 reports
Traits
19 reports
Wellness
8 reports
Reports Archive
200+ archived reports
Share and Compare
150 connections
DNA Relatives
1254 relatives found
Research
9 insights earned
What you can do
Take our Genetics and Weight Loss survey
Take the Genetics and Weight Loss survey. Contribute to research and help us understand how your genes influence weight change following a diet.
Get Started
Research
Explore 23andMe's published discoveries
Thanks to the participation of customers like you, we've made discoveries about the role of genetics in many traits and conditions.
Visit our publications page
Research
Want to see all your results in one page?
Print your new Reports Summary by clicking the Print button from your "All Reports" page.
Go to my "All Reports" page now!
Reports
Answer the next Research question
Are you allergic to pollen?

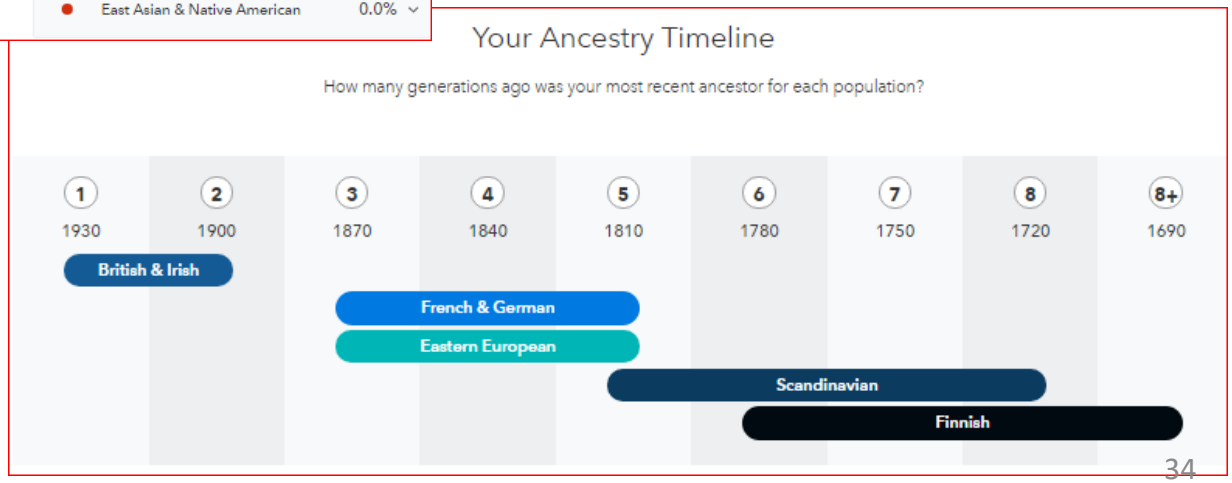
# 23andMe:Ancestry Reports



# 23andMe:Timeline & Compare

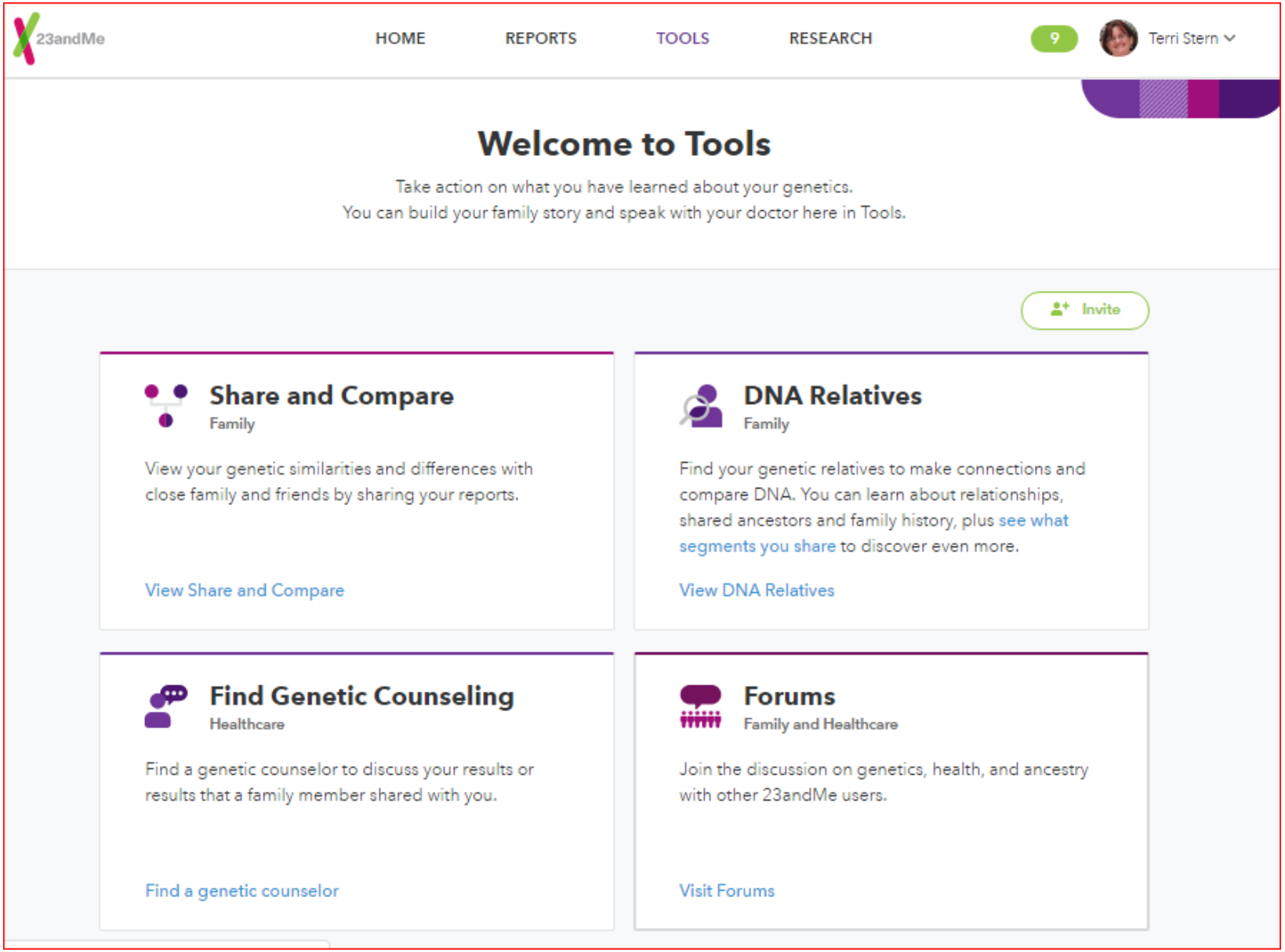


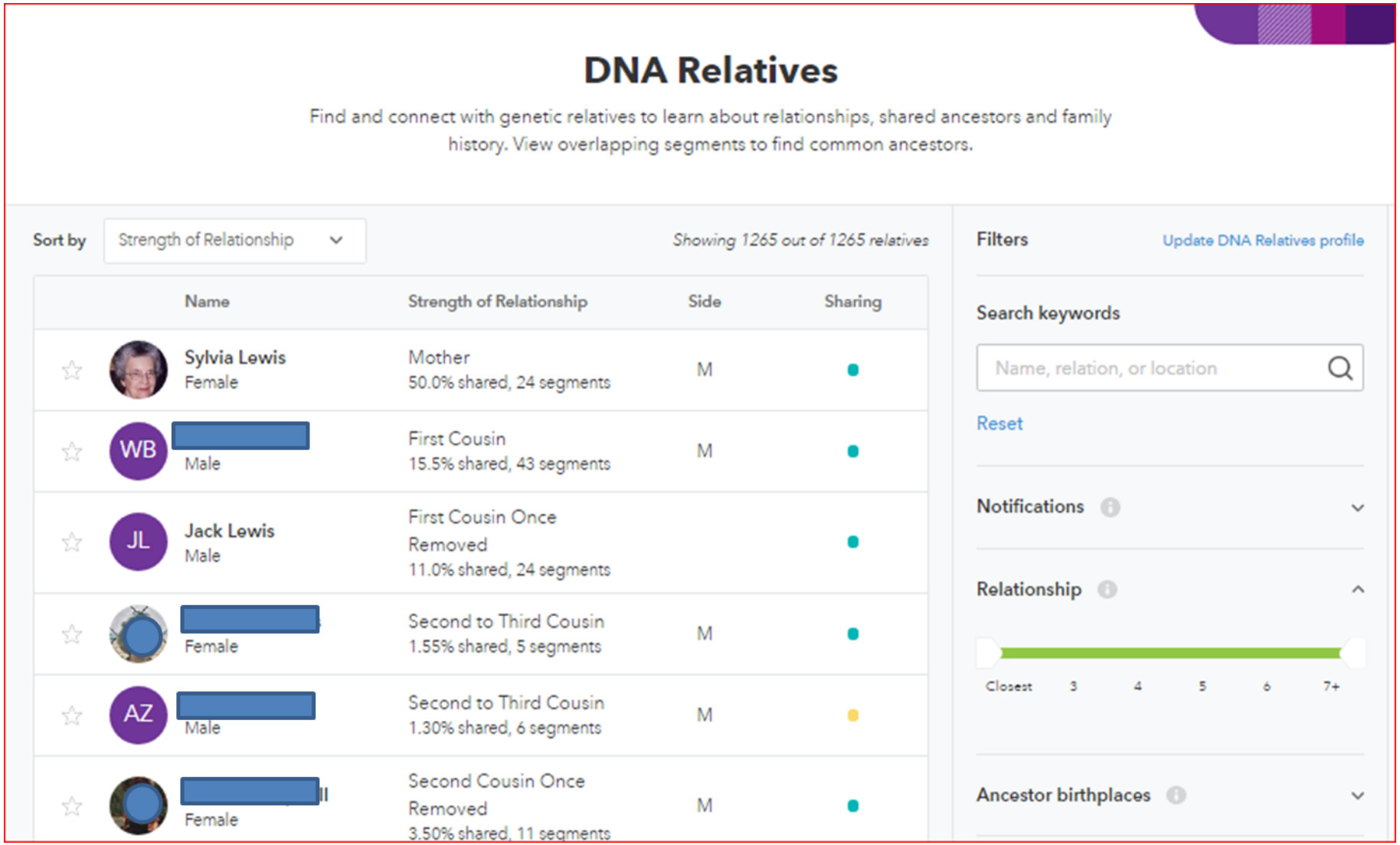
# 23andMe Tools

1. DNA Relatives
   - Match list
   - Surnames
   - Filters: Surname & Birthplace
   - Trees
   - Chromosome Browser
   - Best Triangulation
2. Ancestry Composition
   - Ethnicity by % & mapped to Chromosome
   - Haplogroups
   - Neanderthal Ancestry
3. Internal email communication
4. Raw Data Download

# 23andMe Tools

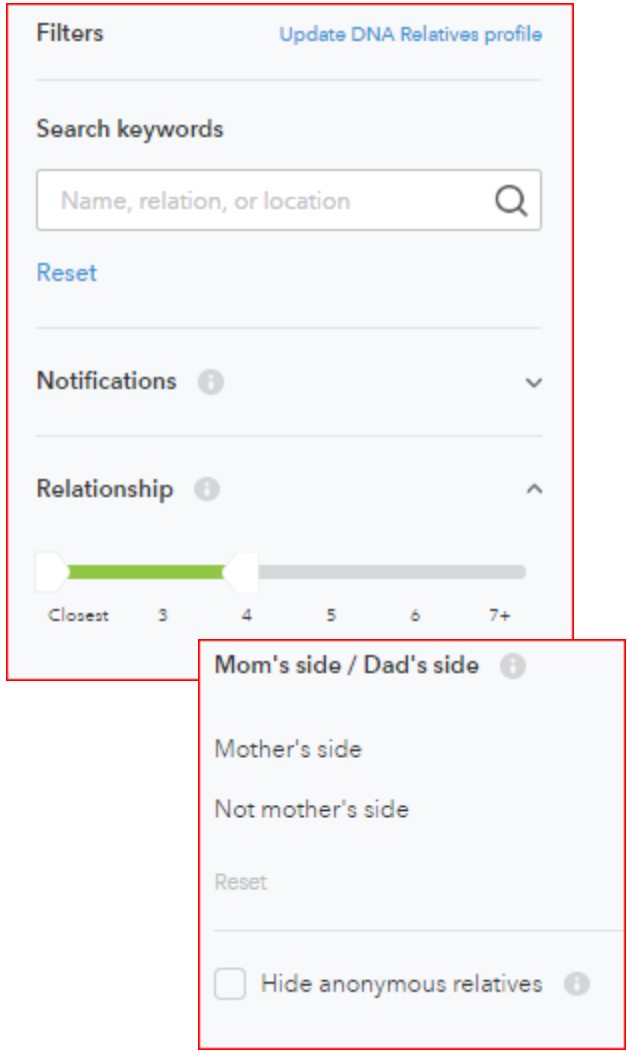


# 23andMe: DNA Relatives

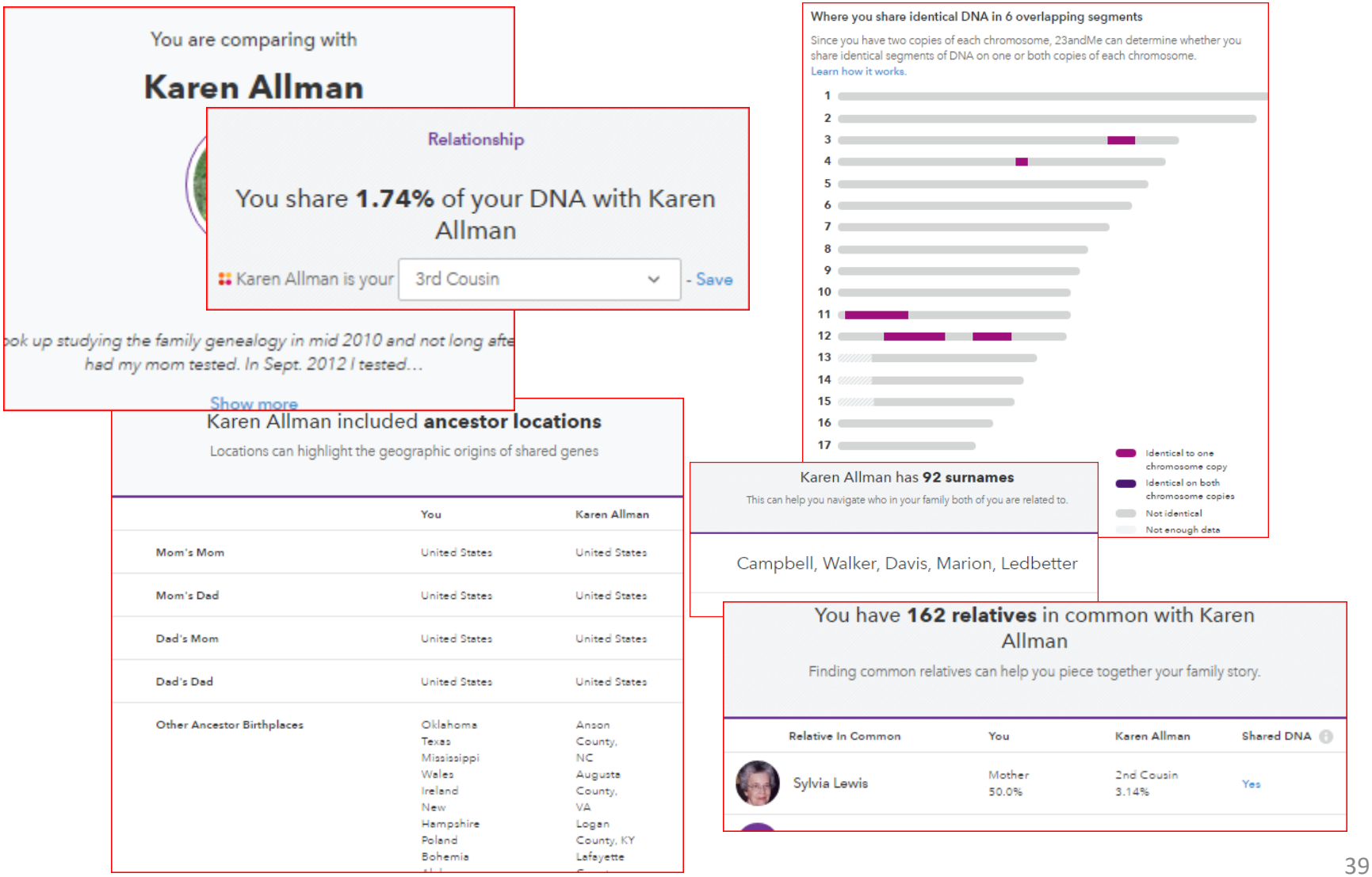


# 23andMe: Search Relatives

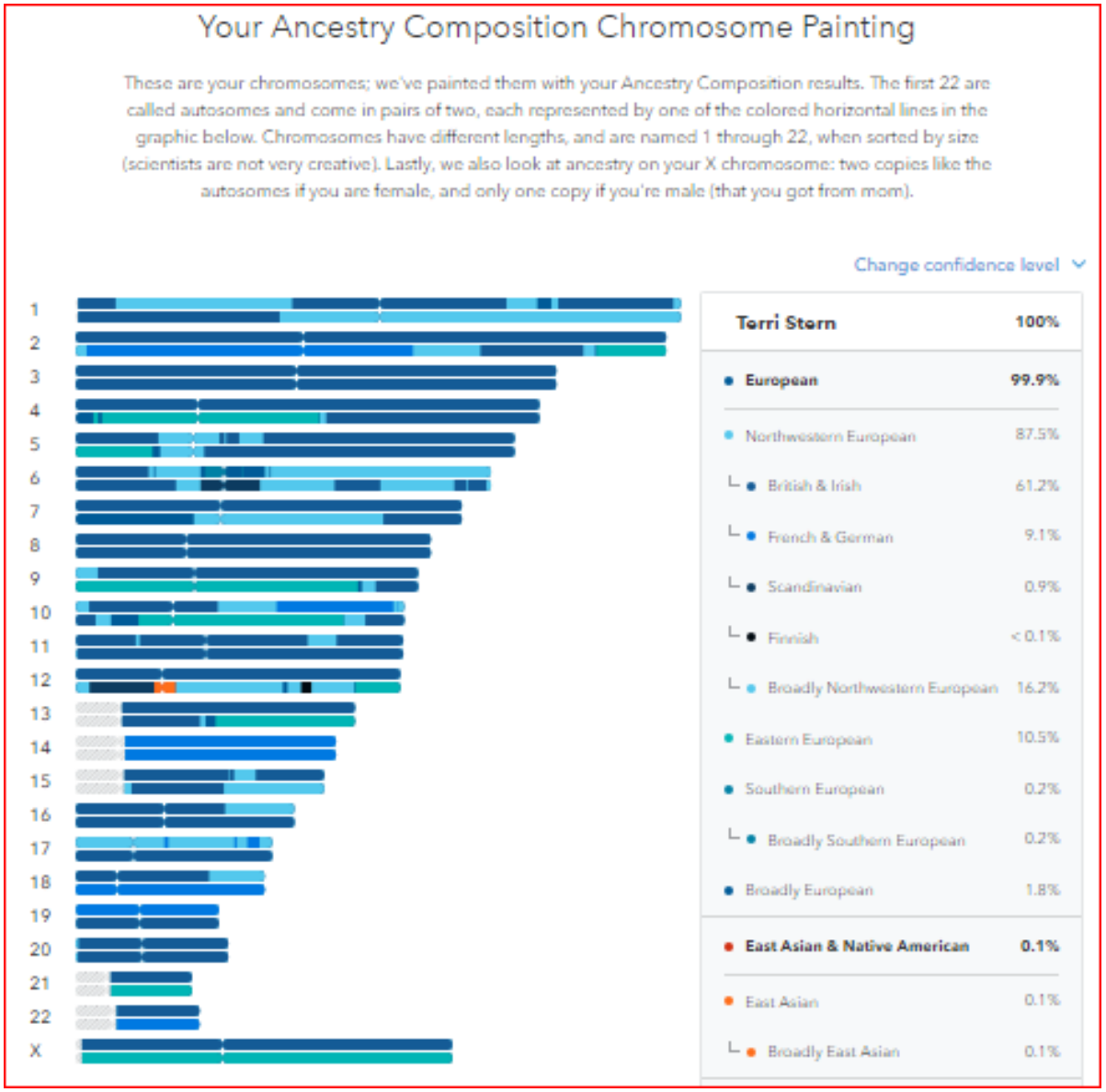




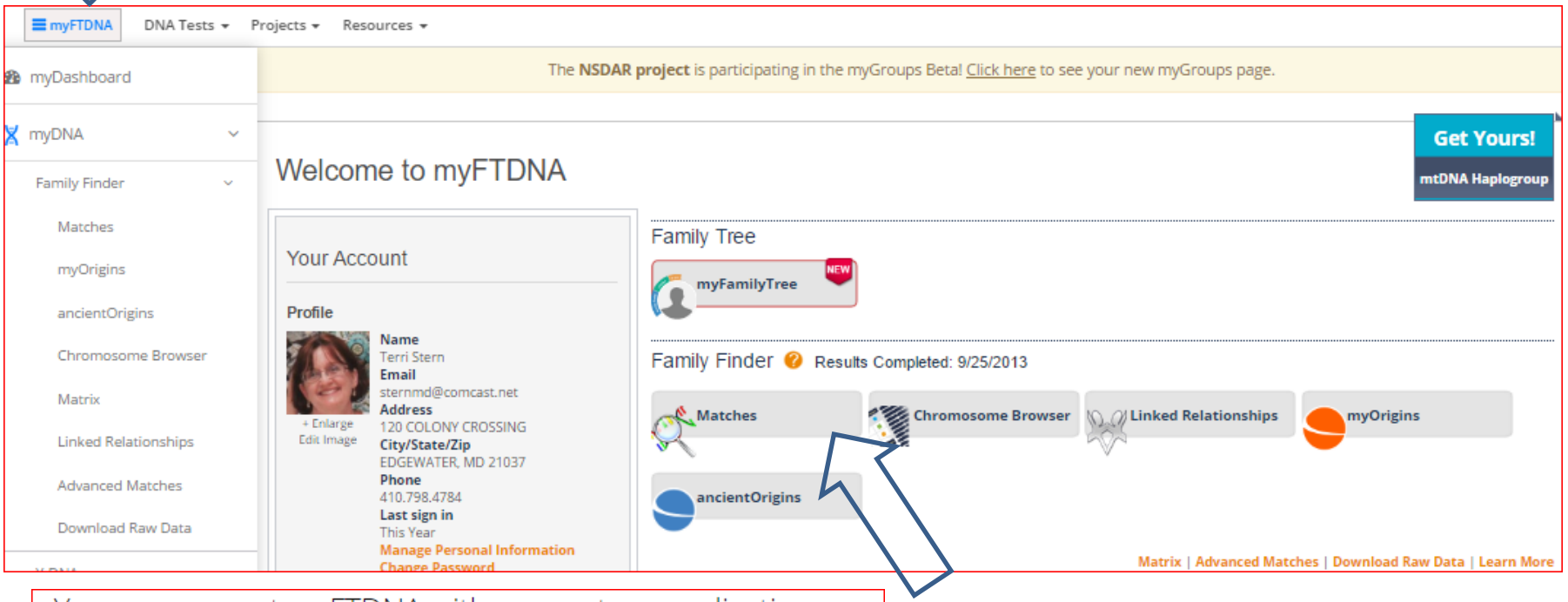
# 23andMe: Relative Record

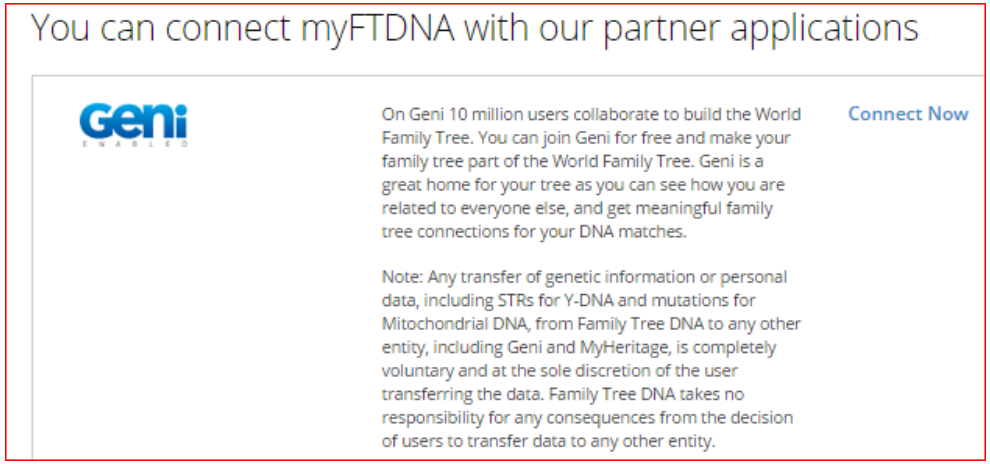


# 23andMe: Chromosome



# FTDNA: Family Finder

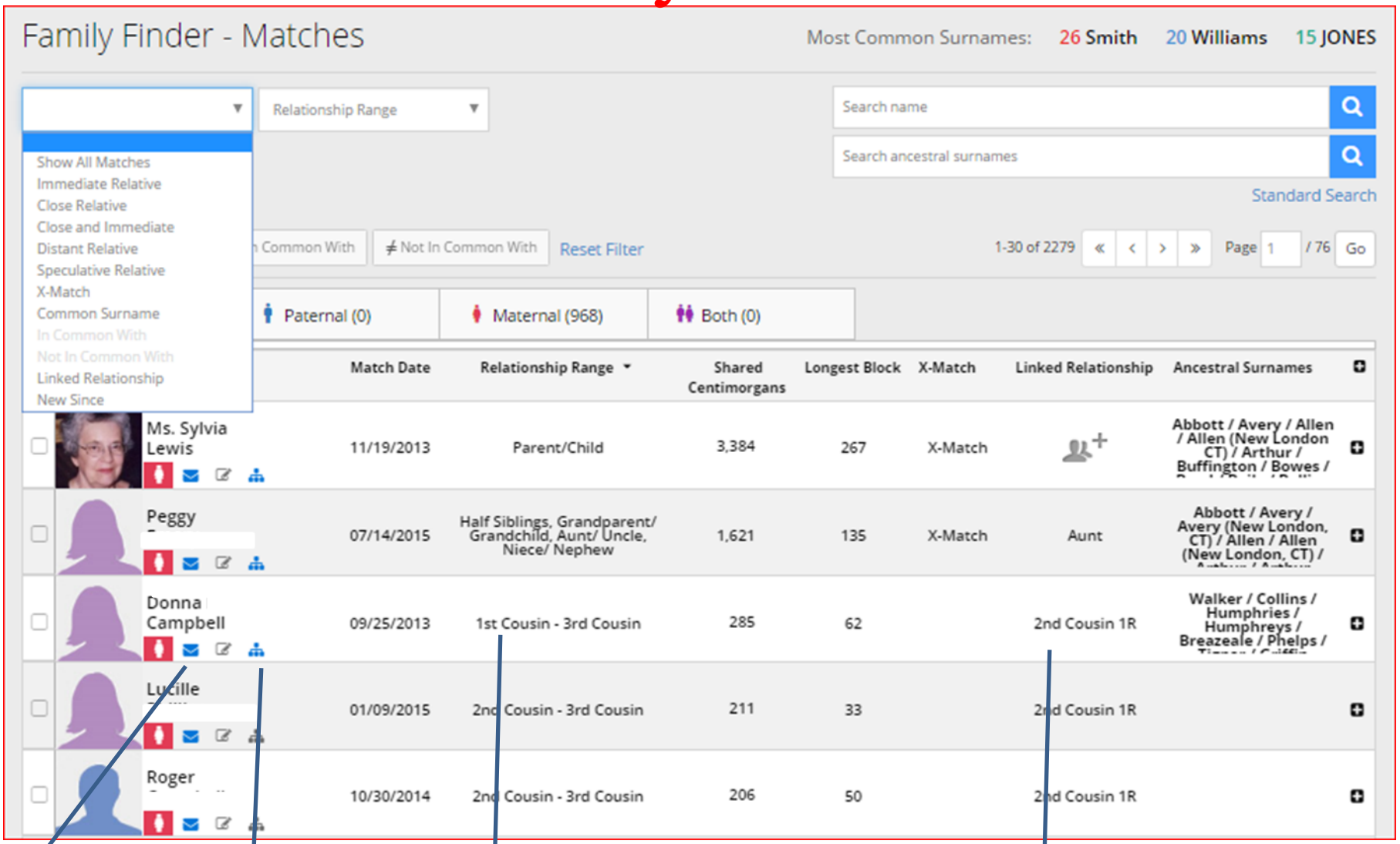


# FTDNA Family Finder Tools

1. Match list
   - Surnames & Locations
   - Trees
   - Filters and Sorting
   - External email
2. Chromosome Browser
3. Gedcom upload
4. Linked Relationships
5. myOrigins & ancientOrigins
6. Raw Data Downloads

# FTDNA Family Finder Matches




Email

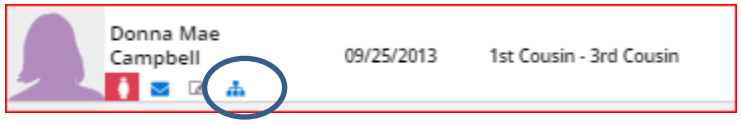
Link to Tree

Predicted Relationship

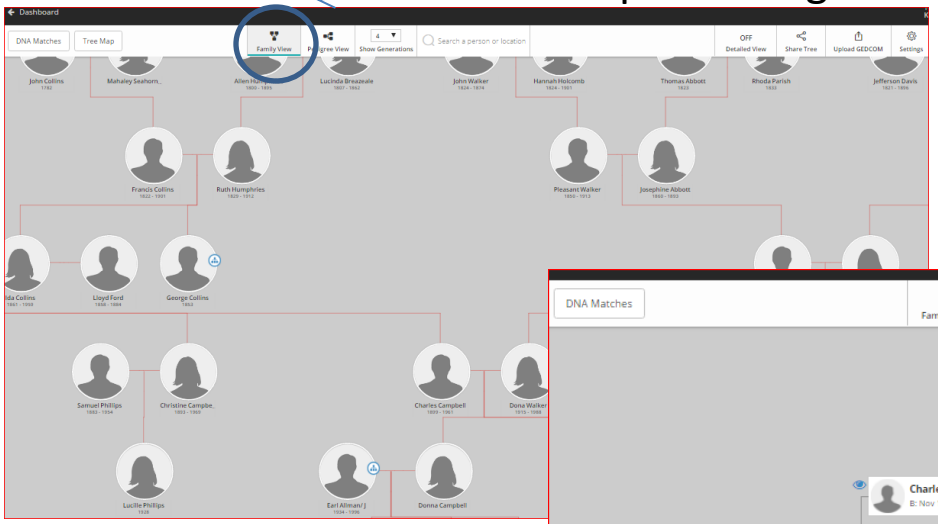
Confirmed Relationship

# FTDNA: Compare Trees

Click on Tree icon from Matches

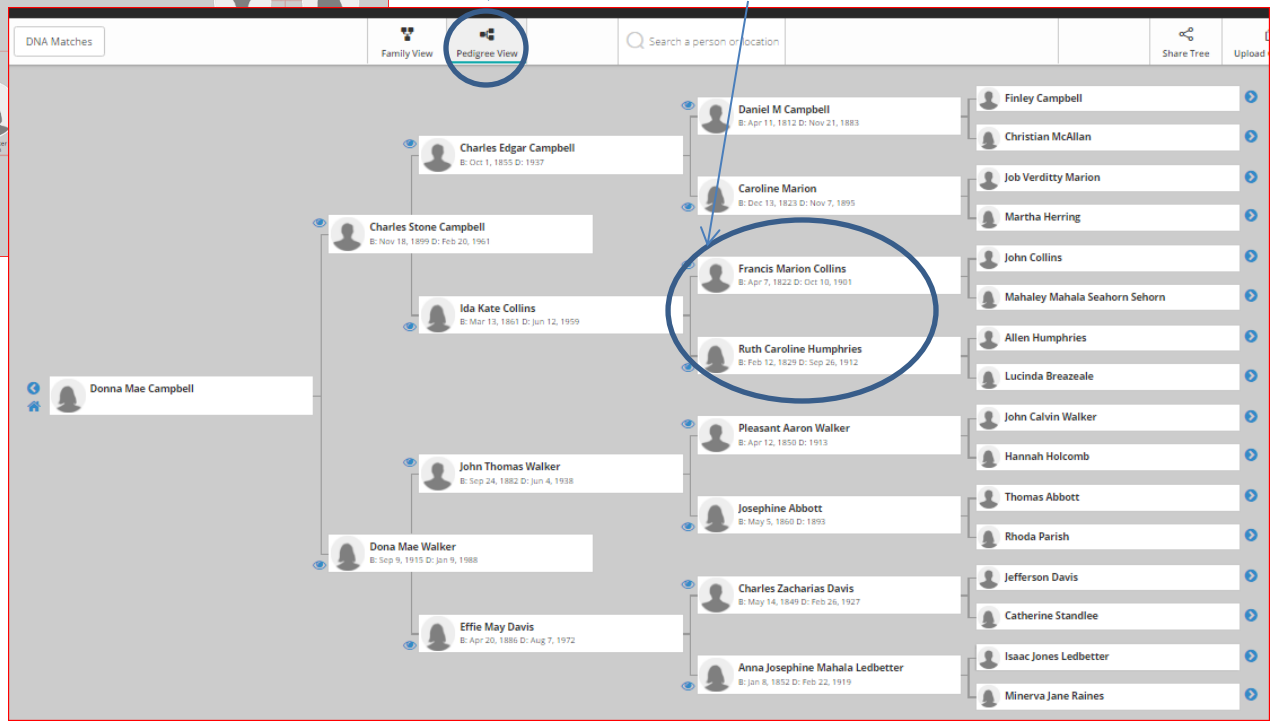



Opens in 4 generation Family View

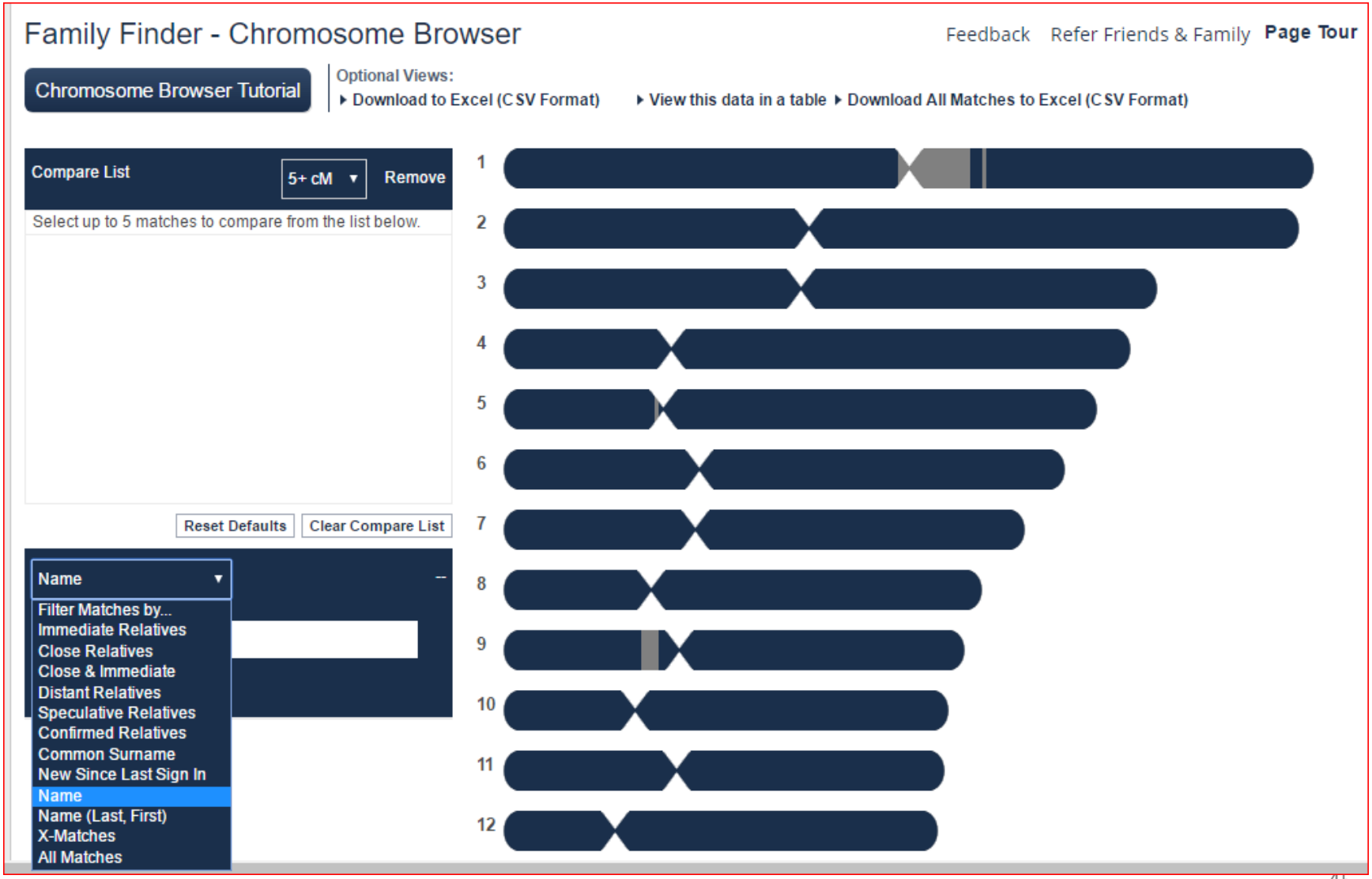



Select Pedigree View

Find Most Recent Common Ancestors



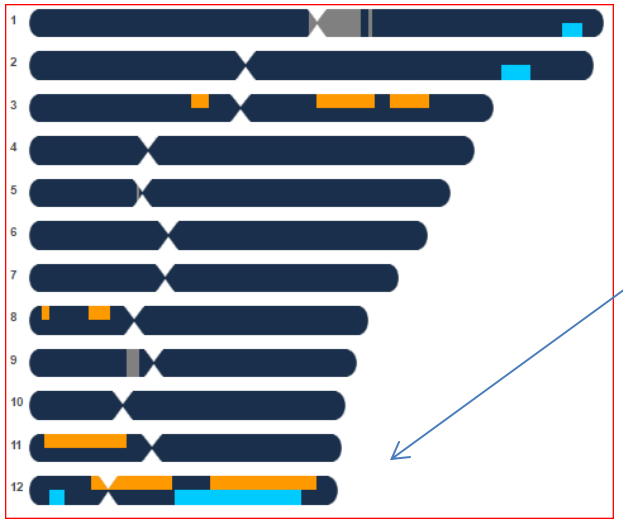
# FTDNA: Chromosome Browser



# FTDNA: Chromosome Browser

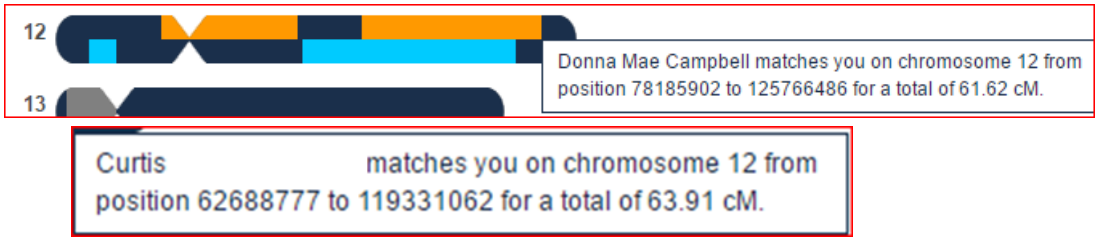
# Family Finder: Triangulation

Donna is a confirmed Maternal 3rd cousin
What can I find out about Curtis?



Step 1: **Compare on Chromosome Browser**

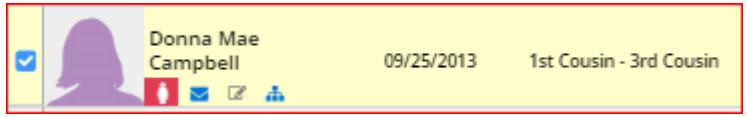
**Result:** Donna and Curtis both match me on Chr 12 at the same location




**Next Question:** Are Donna and Curtis related to each other?

Step 2: **Compare on Matches**

- Select Donna in the Check box
- Select "Not In Common With"





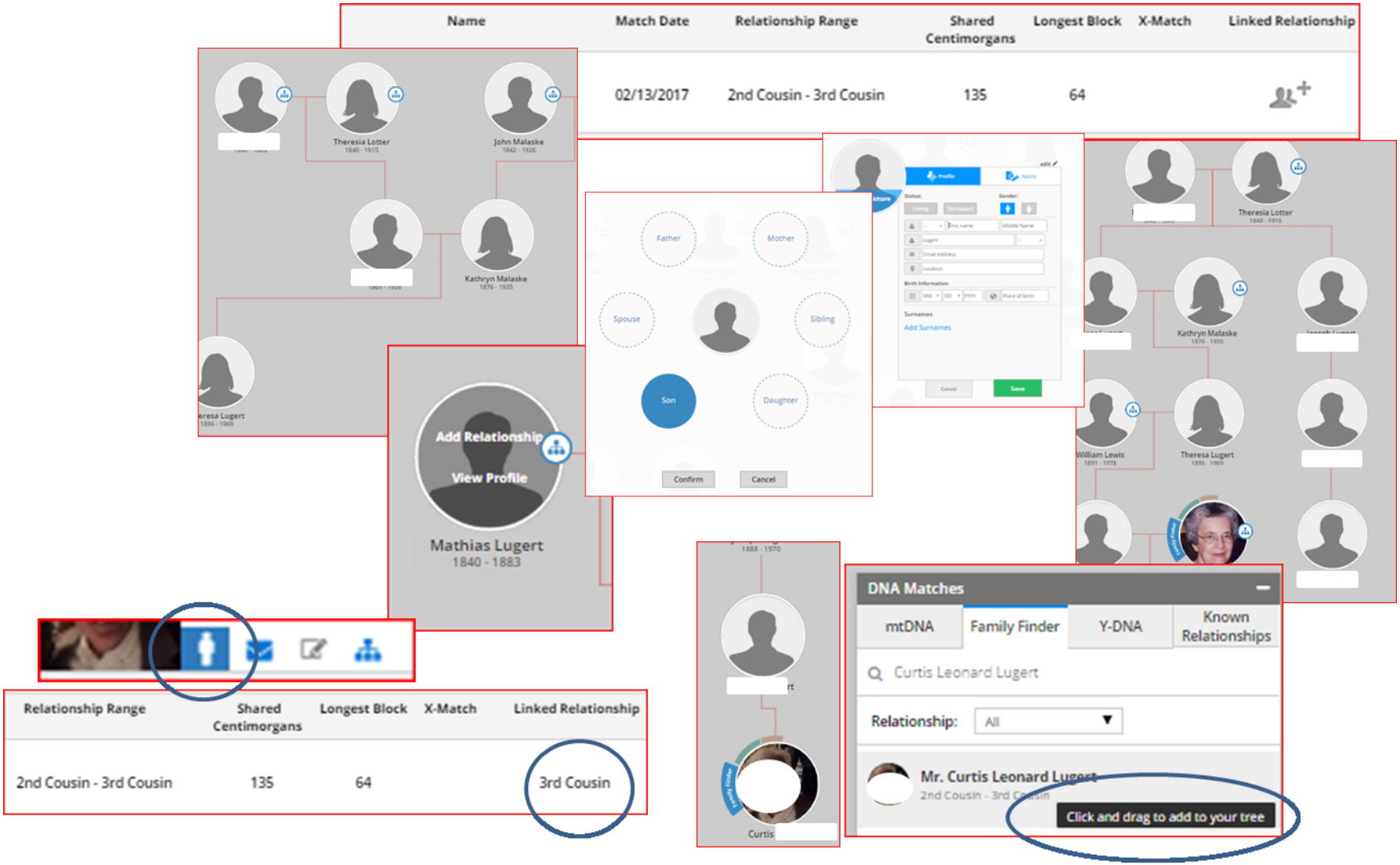
- Curtis appears on Donna's "Not in Common With" List

**Conclusion:** Curtis is a **Paternal** match to me.

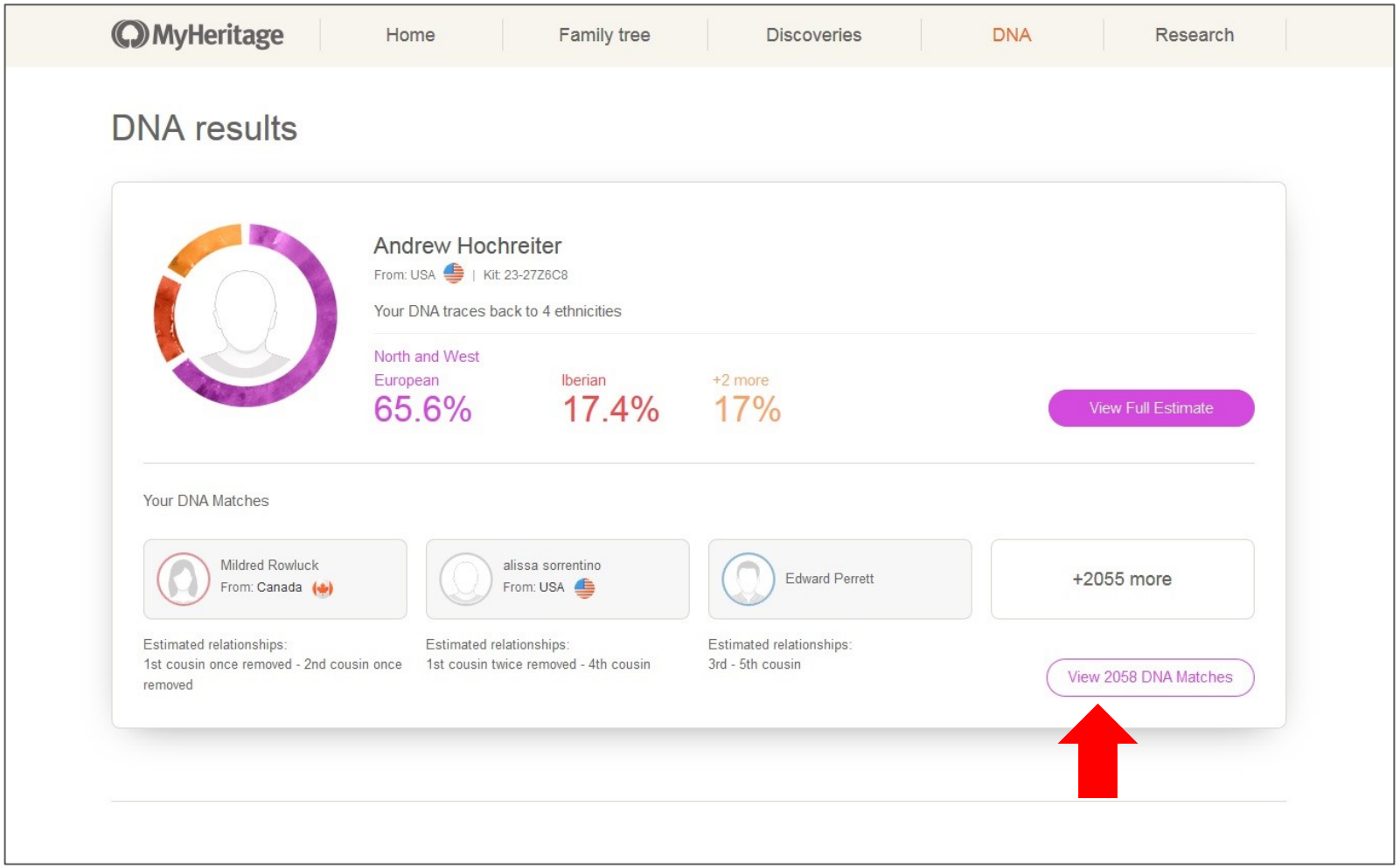
# FTDNA: Linked Relationships

You found your Most Recent Common Ancestor by comparing trees

--now link your match to your tree



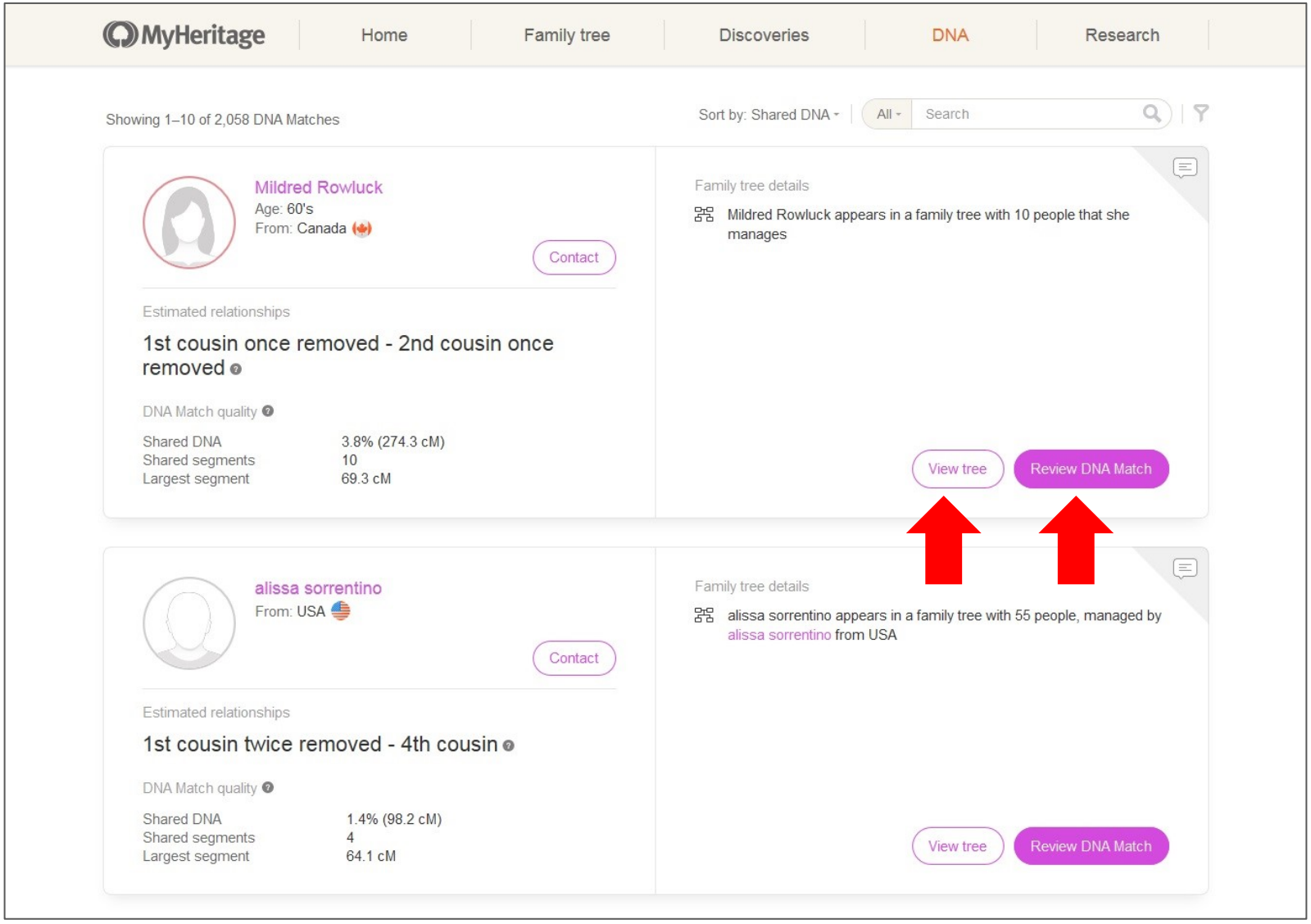
# MyHeritage DNA



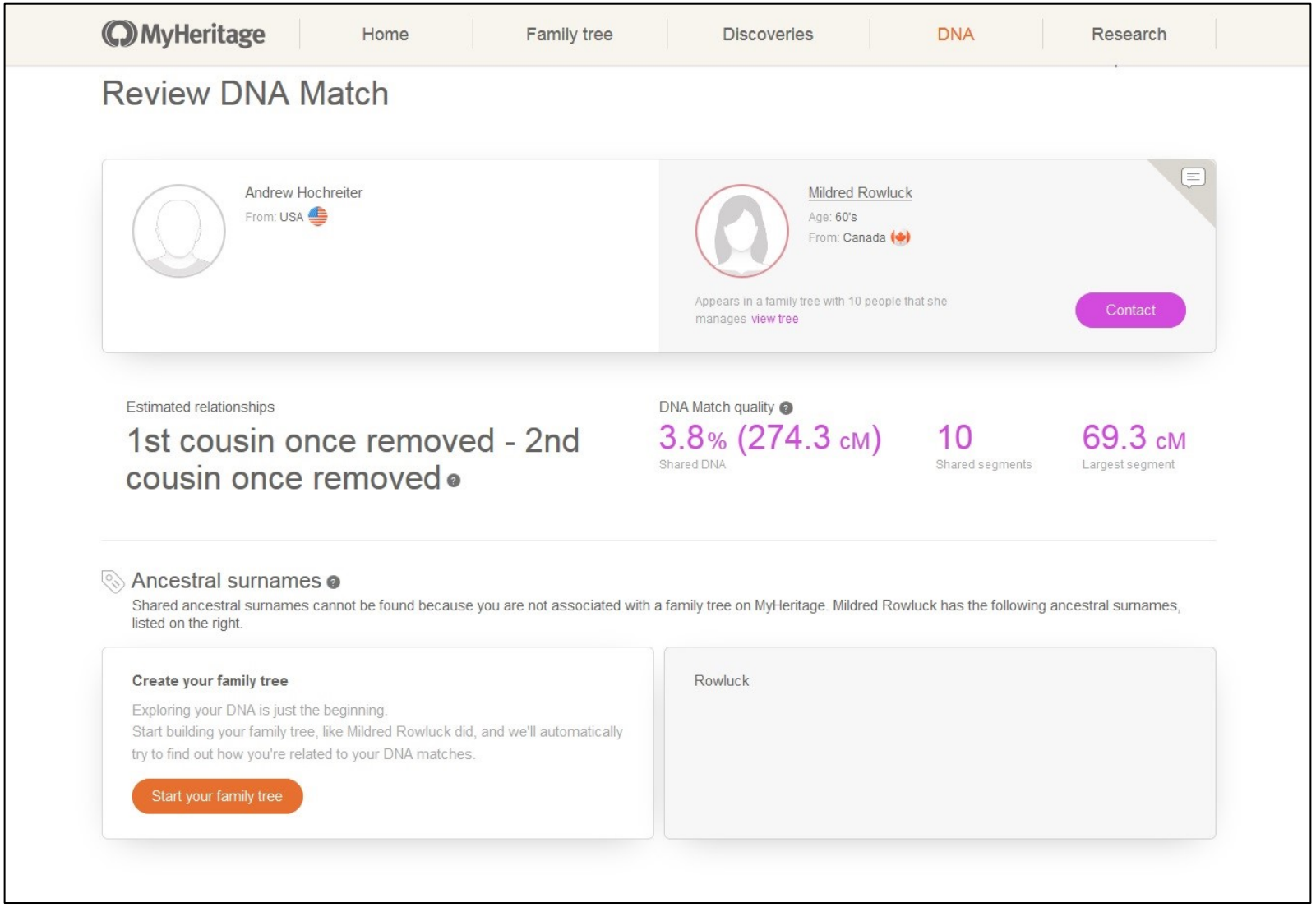
# MyHeritage Tools

1. Match list
   - Surnames & Locations
   - Trees
   - Contact
2. Chromosome Browser
3. Gedcom upload
4. Shared DNA Relationships
5. Shared Ethnicities
6. Raw Data Downloads
7. Pedigree Charts

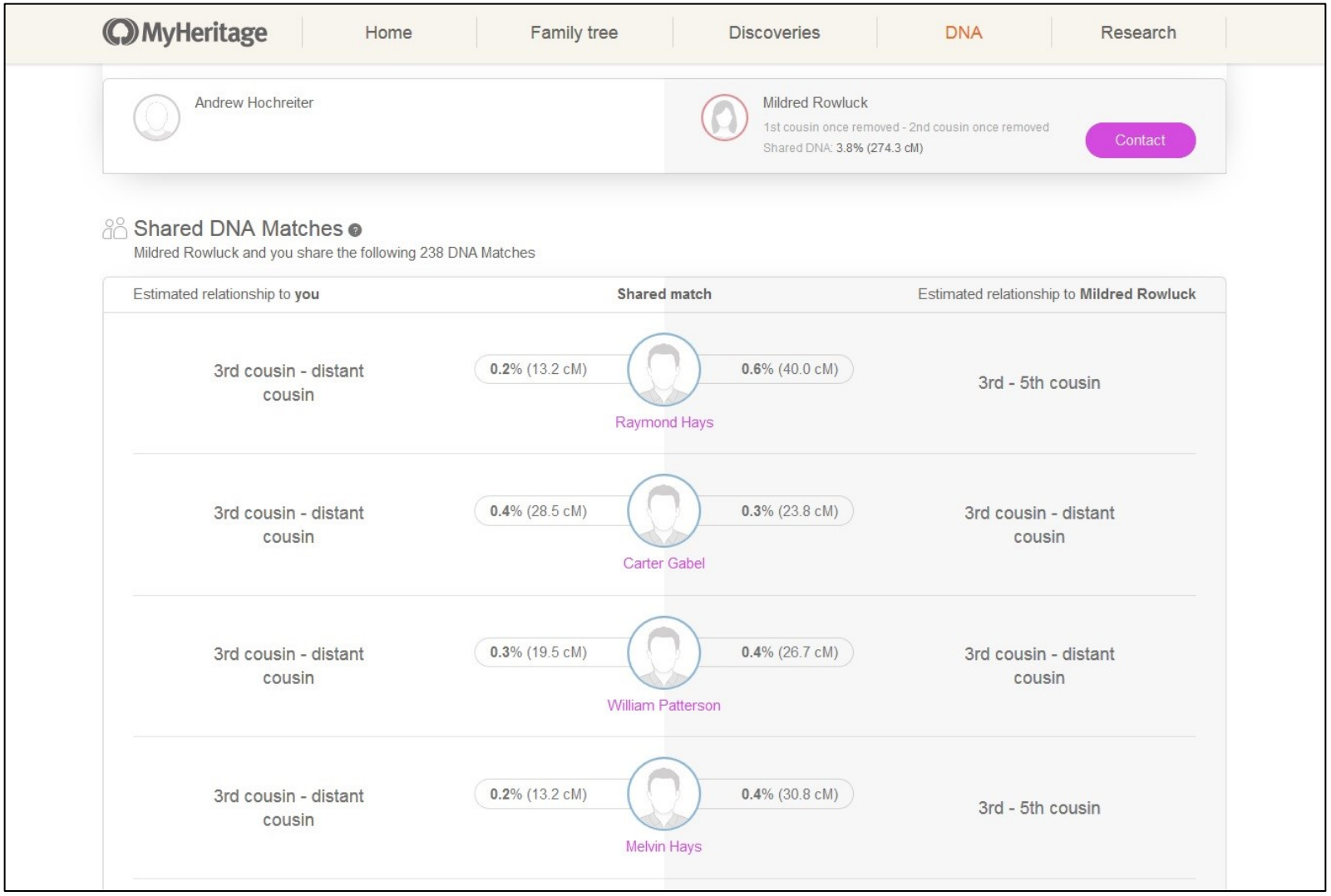
# MyHeritage Matches



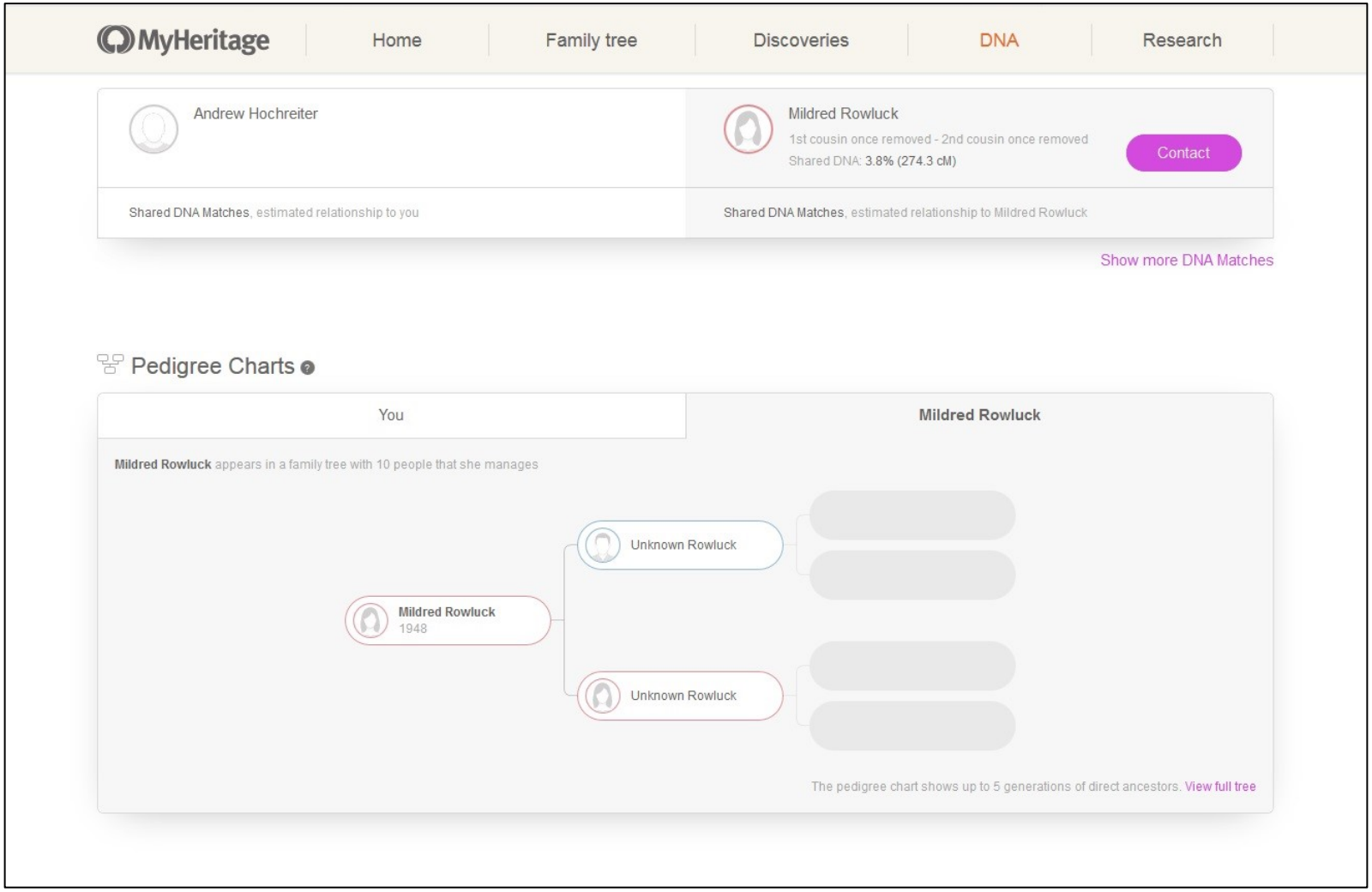
# MyHeritage Match Details



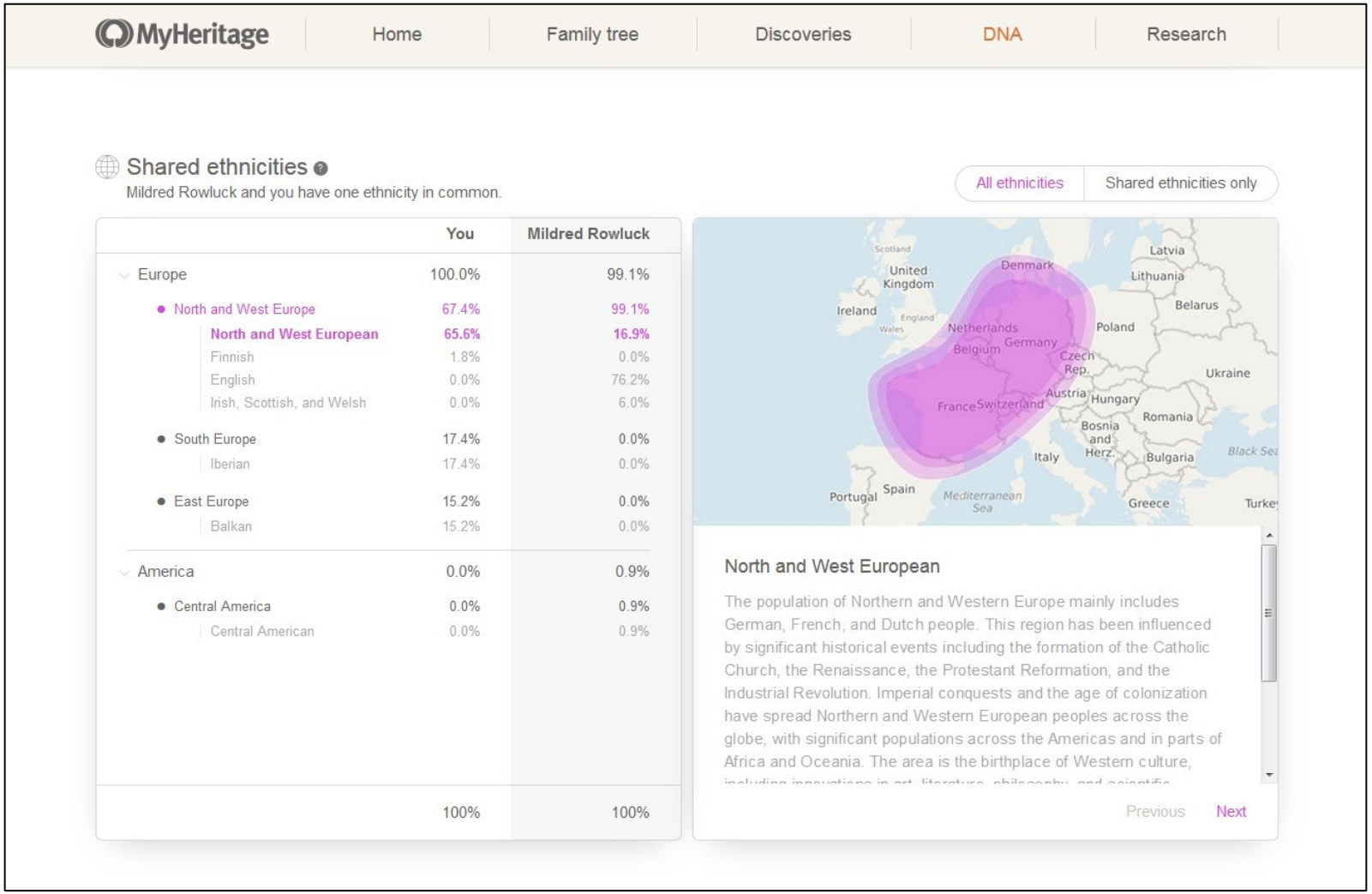
# MyHeritage Shared Matches



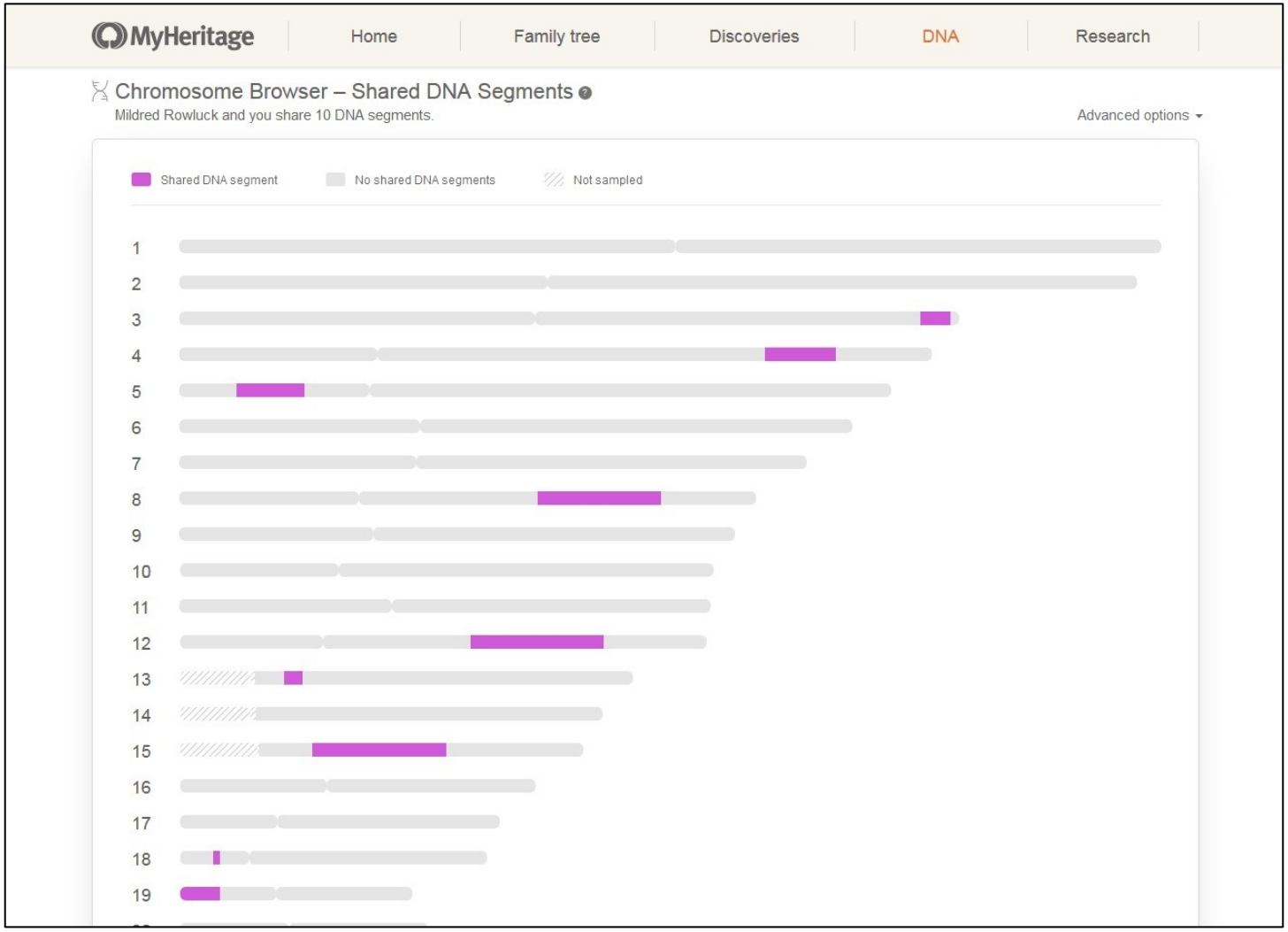
# MyHeritage Pedigree Chart



# MyHeritage Shared Ethnicities



# MyHeritage Chromosome Browser



# Advance Methods

- Triangulation
- GEDmatch
- Genome Mate Pro
- WikiTree

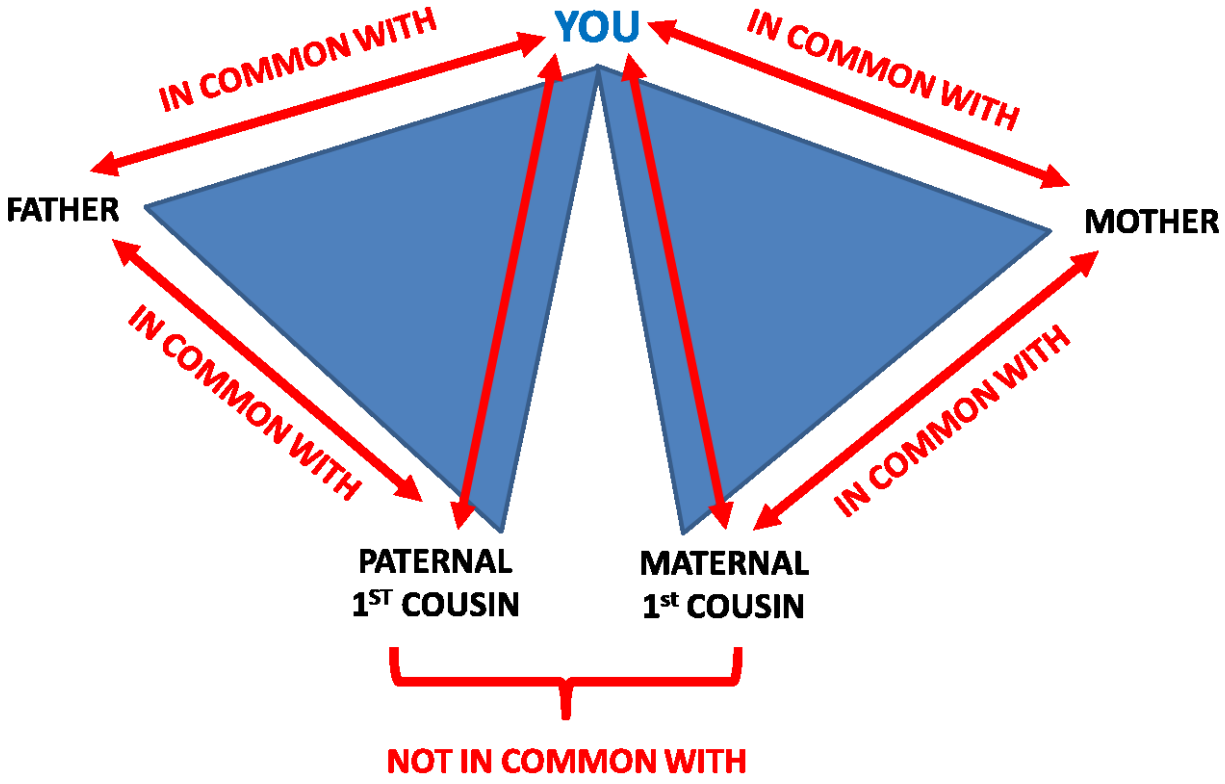
# Triangulation

- **Triangulation assigns specific segments of DNA to specific ancestors by:**
  - The tester's DNA matching the DNA of other testers on a specific segment.
  - Identifying that the individuals who match the tester on that segment also match each other. This is part of the methodology employed to group the testers matches into two groups, the maternal and paternal groupings.
  - Identifying which ancestor contributed that segment to all of the people who match the tester and each other on that same segment.
- **In order for a group of matches to triangulate, they must match each other on the same segment of DNA and they must all share a common ancestor**.

  - Roberta Estes
  - https://dna-explained.com/category/in-common-with/

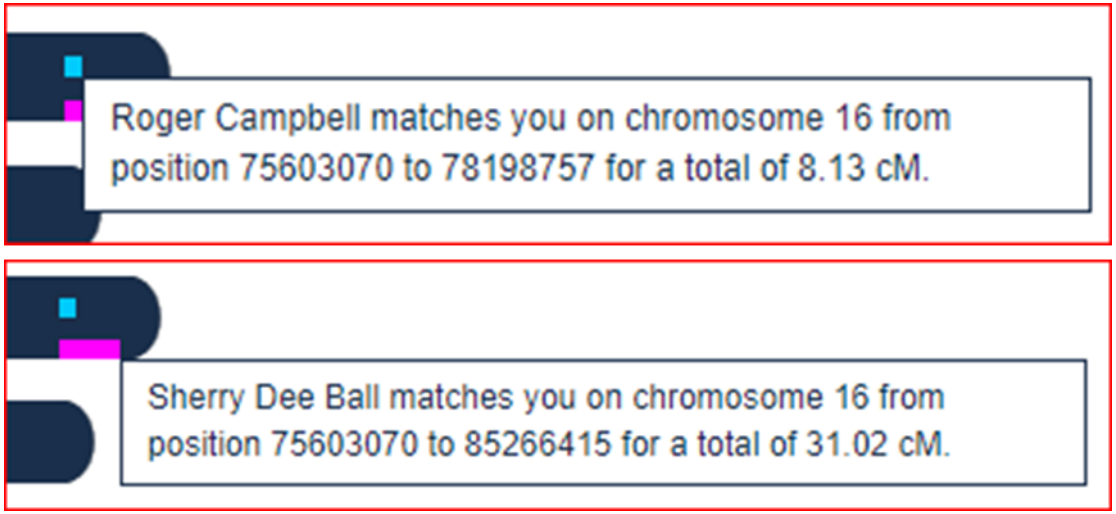
# In Common With (ICW)

In Common With is a function that shows every person that you and one of your matches, match with in common.



# Triangulation

**Triangulation** – Method to assign a DNA segment to a specific ancestor by finding 3 people on a matching segment with a common ancestor in their trees




Does Roger match Sherry on Chr 16?

# GEDmatch

GEDmatch® Tools for DNA & Genealogy Research

- 'One-to-one' compare

Comparing Kit (Roger) and (Sherry)

| Chr | Start Location | End Location | Centimorgans (cM) | SNPs |
|---|---|---|---|---|
| 16 | 70,809,438 | 78,915,089 | 15.9 | 2,730 |

Comparing Kit (Sylvia) and (Roger)

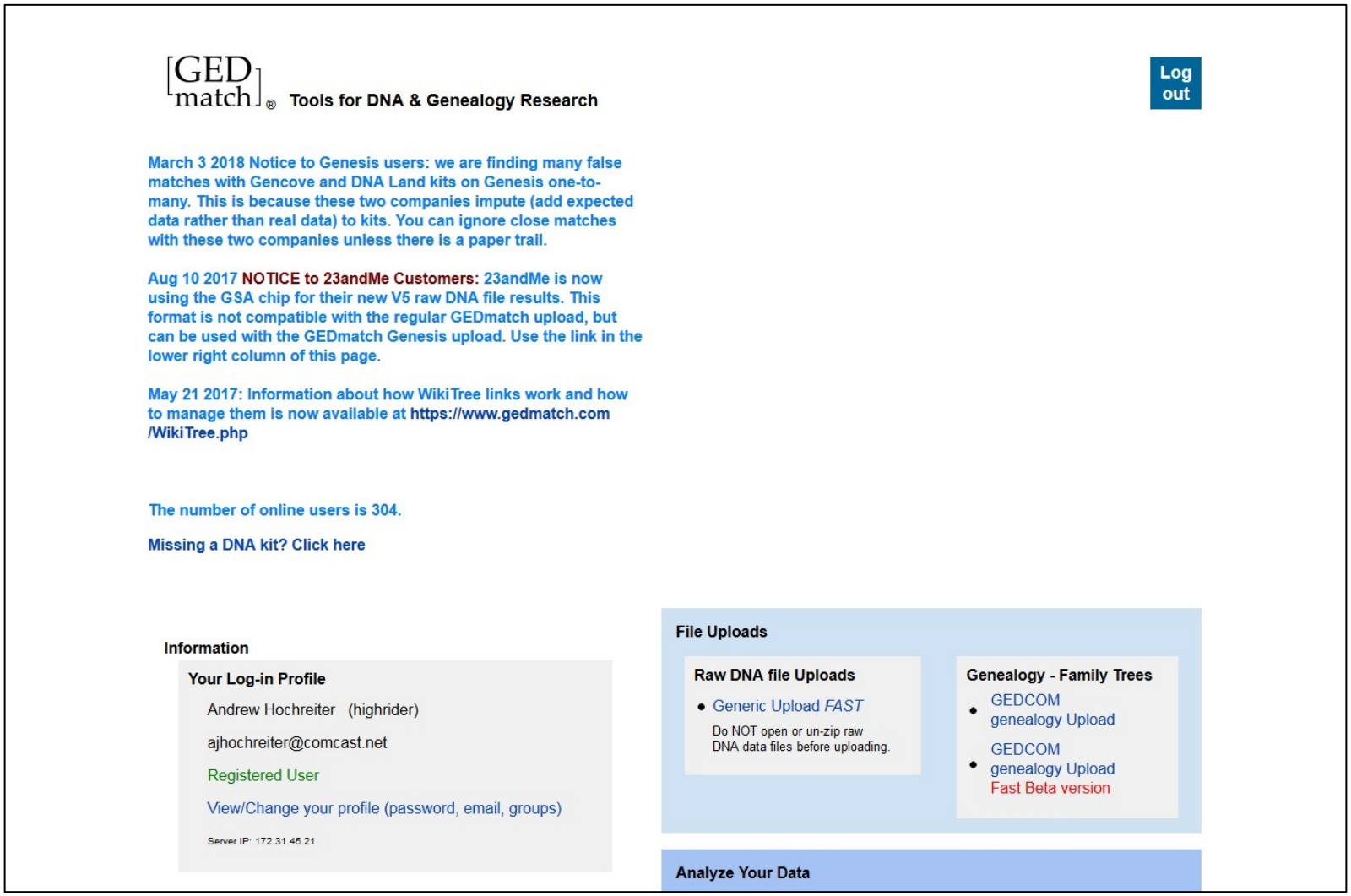
| | | | | |
|---|---|---|---|---|
| 16 | 75,451,654 | 78,267,004 | 9.4 | 1,862 |

Comparing Kit (Sylvia) and (Sherry)

| | | | | |
|---|---|---|---|---|
| 16 | 75,451,654 | 85,308,048 | 33.3 | 4,950 |

Triangulated!

# GEDmatch


GED match
Tools for DNA & Genealogy Research
Log out
March 3 2018 Notice to Genesis users: we are finding many false matches with Gencove and DNA Land kits on Genesis one-to-many. This is because these two companies impute (add expected data rather than real data) to kits. You can ignore close matches with these two companies unless there is a paper trail.
Aug 10 2017 NOTICE to 23andMe Customers: 23andMe is now using the GSA chip for their new V5 raw DNA file results. This format is not compatible with the regular GEDmatch upload, but can be used with the GEDmatch Genesis upload. Use the link in the lower right column of this page.
May 21 2017: Information about how WikiTree links work and how to manage them is now available at https://www.gedmatch.com /WikiTree.php
The number of online users is 304.
Missing a DNA kit? Click here
Information
Your Log-in Profile
Andrew Hochreiter (highrider)
ajhochreiter@comcast.net
Registered User
View/Change your profile (password, email, groups)
Server IP: 172.31.45.21
File Uploads
Raw DNA file Uploads
Generic Upload FAST
Do NOT open or un-zip raw DNA data files before uploading.
Genealogy - Family Trees
GEDCOM genealogy Upload
GEDCOM genealogy Upload Fast Beta version
Analyze Your Data

# GEDmatch Free Tools

**Finding Matches: Tools to compare DNA results using KIT#s**

- **One-to-many** - Free DNA comparison tool. Your top 2,000 matches on GEDmatch.com! Select more Tools from its results page.
- **One-to-one** - Free DNA comparison tool. Compare two Kit#s. You must verify all matches with this tool!
- **X One-to-one** - Free DNA comparison tool. Compare two Kit#s. You must verify all X-DNA matches with this tool!
- **Phasing** - Use a parent's results to increase IBD match accuracy. Separate maternal, and paternal, matches!
- **People who match one or both of two KIT#s** - Compare two Kit#s. Find common relatives that two KIT#s share - and the ones they don't!
- **Are your parents related?** - Free DNA tool. Essential first test for everyone ...
- **3D Chromosome Browser** - Free DNA comparison tool. Compare 3 to 10 Kit#s. See segment matches in 3D!
- **Multiple Kit Analysis** - Generic kit entry for submittal to visualization page. Select up to 50 Kit#s
- **Diagnostics** - Verify your DNA file upload to GEDmatch.com worked OK Check your results for no calls, heterozygosity, gender of donor...
- **Genesis Beta** - * New matching algorithm * - lower thresholds - better accuracy A peek at the future! Accepts raw zipped .VCF DNA data from more companies!

# GEDmatch Free Tools

**Ethnicity and Population Genetics Tools**

Where are your distant ancestors from? What does DNA have to say about your ethnicity?

- **Admixture** - Ethnicity Calculators
- **Archaic DNA Matches** - Compare your genome to Ancient Peoples'

**Phenotype Tools**

- **Eye Color** - How accurately can genetics predict your eye color and subtleties?

**Genealogy Tools**

Automatically compare family tree GEDCOM files.

- **GEDCOM upload** - Get your family tree on GEDMatch.com, Link your Kit# to it.
- **GEDCOM search** - Compare your GEDCOM to all or one GEDCOMs based on name, place, parents, etc.
- **GEDCOM + DNA matches** - Display a One-to-one hyperlinked list of GEDCOMs of people that have a DNA match with you.
- **GEDCOMs and Family Trees on GEDmatch.com** - How to manage and view GEDCOM resources.

# GEDmatch Tier One Tools

Requires a $10 contribution for one month

1**. Matching Segment Search** – This Tier 1 tool is for finding shared segments. You get a list of all your segment matches suitable for cutting and pasting into a spreadsheet. This utility allows you to find other kits with matching chromosome segments. You can vary the selection criteria.
2. **Relationship Tree projection** –This Tier 1 utility calculates probable relationship paths between two KIT#s based on Autosomal and X-DNA Genetic Distances. It is experimental and the results should not be considered absolute.
3. **Lazarus** – This Tier 1 tool constructs a pseudo Kit# for a deceased or missing relative from related Kit#s. It is designed to re-create a target kit# DNA profile by combining the matching segments between a deceased person's descendants and their other relatives (ancestors, siblings, aunts, uncles, etc.). The more close relatives' kit#s you have - the better your results will be.

# GEDmatch Tier One Tools

4. **Triangulation** – This Tier 1 tool takes the top 300 matches and finds which ones match each other with details. The concept is to show where you have two or more people who match each other at the same location as you match each of them. A three-way (or more) match means that all of you share a common ancestor from whom you got that DNA segment. The format can be copied to a spreadsheet. Results can be displayed in tabular and graphical format for each matching segment. This is by far the most popular tool and automates a very tedious process into a highly useful exercise.
5. **Triangulation Groups** - This utility groups your triangulated matches together and highlights the "hottest" groups. It is useful for selecting matches to pursue. You can select to see the most "hot" groups of triangulated segments arranged by chromosome or group.
6. **My Evil Twin** – This Tier 1 tool constructs a pseudo phased Kit# for the DNA that is *not* inherited by a child from a parent. It is similar to the phasing tool. **You must have at least one parent and the child's DNA Kit#s to use this tool.** Everyone inherits 50% of each of their parents' DNA. This tool identifies the DNA a child **did not inherit** from a parent - the "other" 50%. Although the child does not share this DNA, it is significant for tracing ancestors of that parent. It still represents DNA from the child's ancestors, but the child did not inherit that DNA.

# Genome Mate Pro


## Description

Genome Mate Pro is an app to help manage the data collected from *autosomal DNA* research.

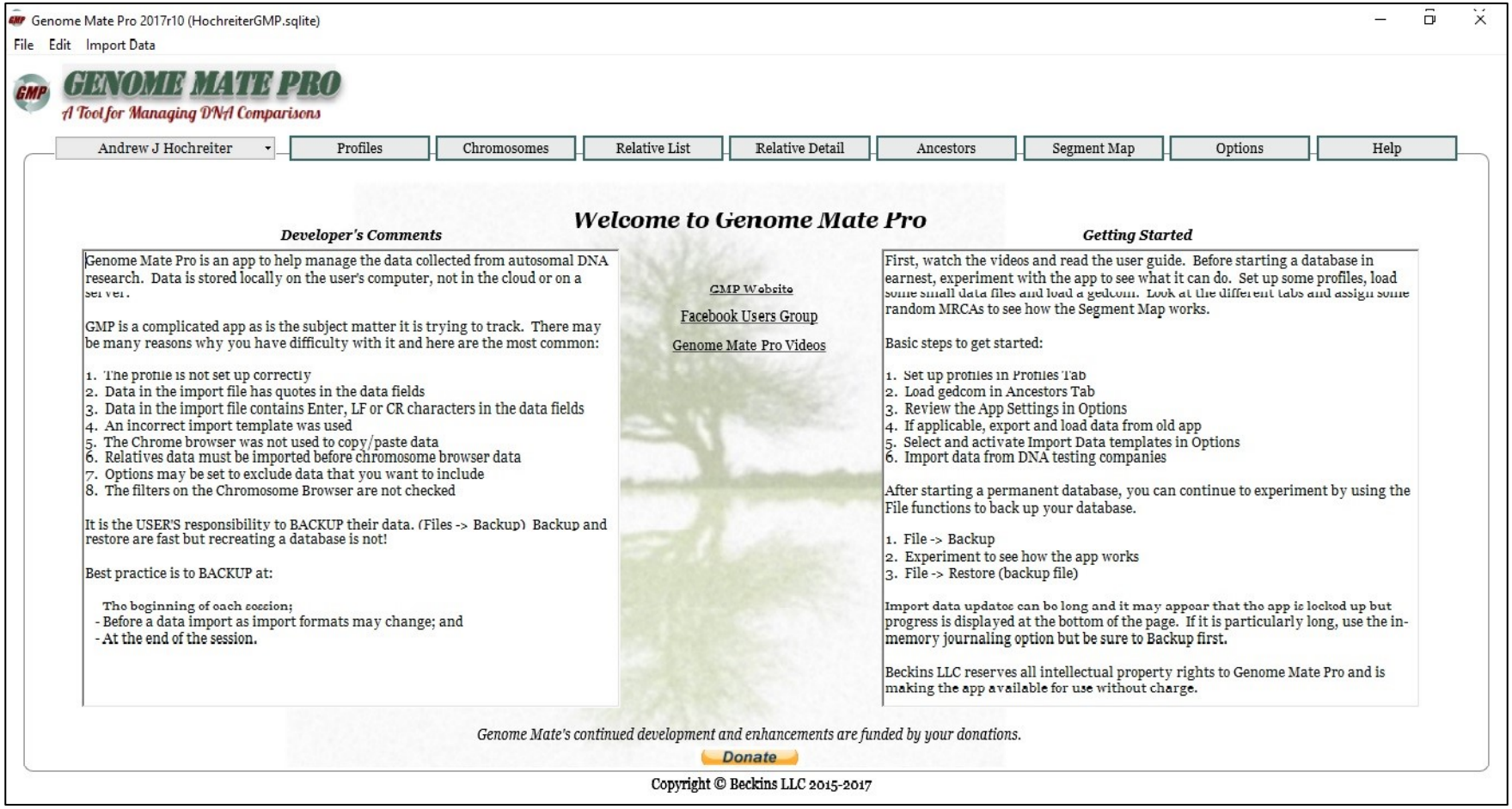
It is available for the Windows, Mac and Linux desktop platforms.

## GMP Features

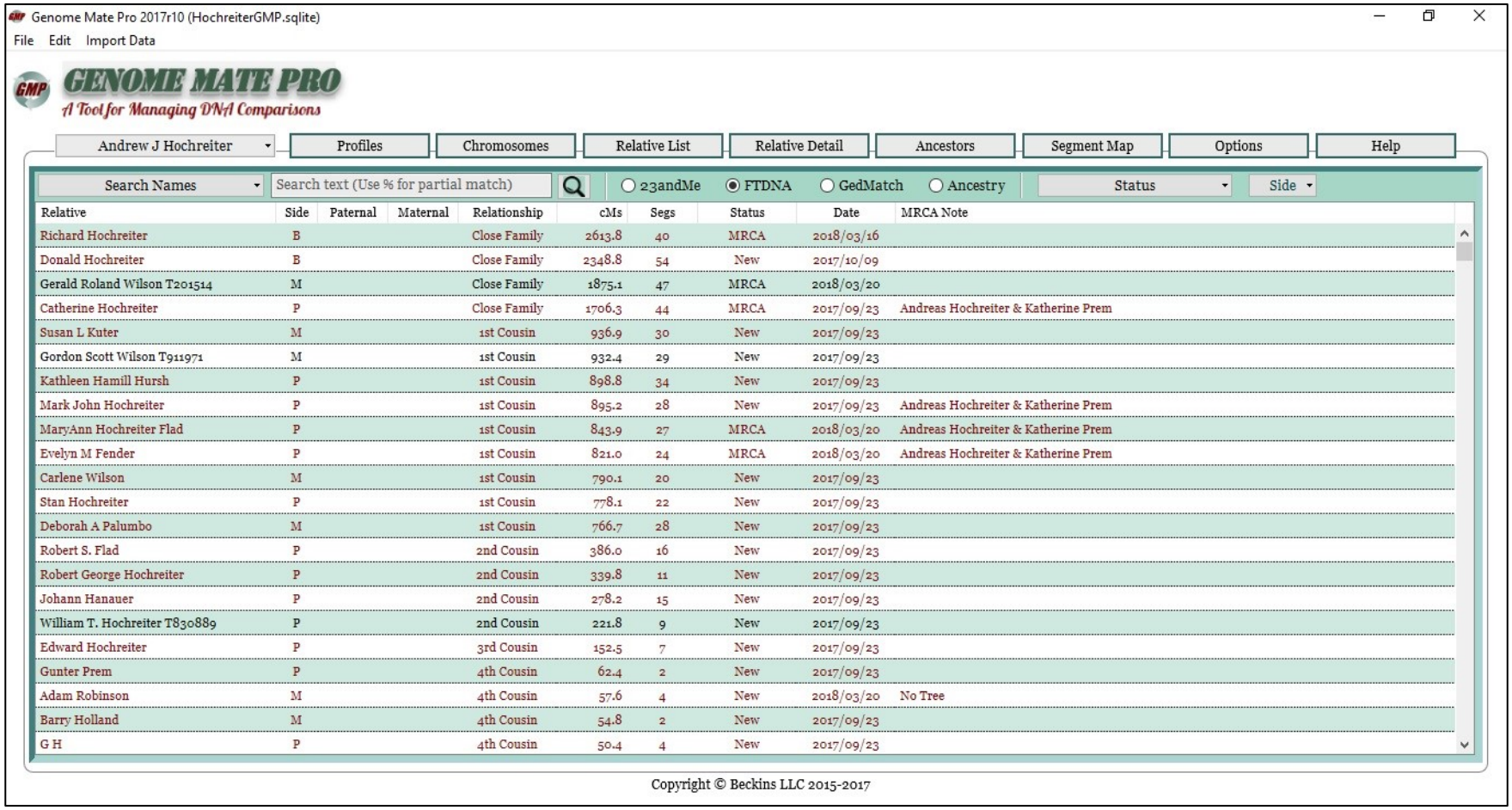
- *One Database to house data for multiple DNA kits*
- *Import 23andMe, FTDNA, Ancestry and GedMatch data*
- *Chromosome Mapping of Common Ancestors*
- *Triangulation and ICW Grouping*
- *Import Ancestors for each Profile from Gedcom*
- *Import Ahnentafel for Ancestry & FTDNA Relatives*
- *Show Ancestors on X-Inheritance Path*

https://www.getgmp.com

# Genome Mate Pro



# GMP Relatives List


Genome Mate Pro 2017r10 (HochreiterGMP.sqlite)

File Edit Import Data

GENOME MATE PRO
A Tool for Managing DNA Comparisons

Andrew J Hochreiter | Profiles | Chromosomes | Relative List | Relative Detail | Ancestors | Segment Map | Options | Help

Search Names | Search text (Use % for partial match) | 23andMe | FTDNA | GedMatch | Ancestry | Status | Side

| Relative | Side | Paternal | Maternal | Relationship | cMs | Segs | Status | Date | MRCA Note |
|---|---|---|---|---|---|---|---|---|---|
| Richard Hochreiter | B | | | Close Family | 2613.8 | 40 | MRCA | 2018/03/16 | |
| Donald Hochreiter | B | | | Close Family | 2348.8 | 54 | New | 2017/10/09 | |
| Gerald Roland Wilson T201514 | M | | | Close Family | 1875.1 | 47 | MRCA | 2018/03/20 | |
| Catherine Hochreiter | P | | | Close Family | 1706.3 | 44 | MRCA | 2017/09/23 | Andreas Hochreiter & Katherine Prem |
| Susan L Kuter | M | | | 1st Cousin | 936.9 | 30 | New | 2017/09/23 | |
| Gordon Scott Wilson T911971 | M | | | 1st Cousin | 932.4 | 29 | New | 2017/09/23 | |
| Kathleen Hamill Hursh | P | | | 1st Cousin | 898.8 | 34 | New | 2017/09/23 | |
| Mark John Hochreiter | P | | | 1st Cousin | 895.2 | 28 | New | 2017/09/23 | Andreas Hochreiter & Katherine Prem |
| MaryAnn Hochreiter Flad | P | | | 1st Cousin | 843.9 | 27 | MRCA | 2018/03/20 | Andreas Hochreiter & Katherine Prem |
| Evelyn M Fender | P | | | 1st Cousin | 821.0 | 24 | MRCA | 2018/03/20 | Andreas Hochreiter & Katherine Prem |
| Carlene Wilson | M | | | 1st Cousin | 790.1 | 20 | New | 2017/09/23 | |
| Stan Hochreiter | P | | | 1st Cousin | 778.1 | 22 | New | 2017/09/23 | |
| Deborah A Palumbo | M | | | 1st Cousin | 766.7 | 28 | New | 2017/09/23 | |
| Robert S. Flad | P | | | 2nd Cousin | 386.0 | 16 | New | 2017/09/23 | |
| Robert George Hochreiter | P | | | 2nd Cousin | 339.8 | 11 | New | 2017/09/23 | |
| Johann Hanauer | P | | | 2nd Cousin | 278.2 | 15 | New | 2017/09/23 | |
| William T. Hochreiter T830889 | P | | | 2nd Cousin | 221.8 | 9 | New | 2017/09/23 | |
| Edward Hochreiter | P | | | 3rd Cousin | 152.5 | 7 | New | 2017/09/23 | |
| Gunter Prem | P | | | 4th Cousin | 62.4 | 2 | New | 2017/09/23 | |
| Adam Robinson | M | | | 4th Cousin | 57.6 | 4 | New | 2018/03/20 | No Tree |
| Barry Holland | M | | | 4th Cousin | 54.8 | 2 | New | 2017/09/23 | |
| G H | P | | | 4th Cousin | 50.4 | 4 | New | 2017/09/23 | |

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# GMP Segment Map

# Genome Mate Pro: Chr 16

Chr: 16 | Search | S | ☑ Maternal | ☑ Paternal | ☐ Unknown | ☐ Hidden | Hide Min: ☑ cMs | ☐ SNPs | ☐ Length | Max: ☐ cMs

| Profile | Relative | Side | Group | Chr | Start | End | cMs | SNPs | Graphic of B |
|---|---|---|---|---|---|---|---|---|---|
| SAL* | Sarah | P | | 16 | 74.9 | 80.5 | 15.6 | 1,847 | |
| SAL* | Pam | M | 3-5TH x match | 16 | 75.1 | 78.9 | 10.8 | 1,664 | |
| SAL* | Bruce | M | | 16 | 75.4 | 78.1 | 9.1 | 1,288 | |
| SAL* | Donna | M | | 16 | 75.4 | 78.1 | 9.2 | 933 | |
| SAL* | Joseph | M | | 16 | 75.4 | 78.3 | 9.5 | 980 | |
| SAL* | WanP | M | | 16 | 75.4 | 78.3 | 9.5 | 1,030 | |
| SAL* | MixologyZoe | M | | 16 | 75.4 | 78.3 | 9.5 | 1,028 | |
| SAL* | Robert | M | | 16 | 75.4 | 78.9 | 10.6 | 1,600 | |
| **SAL*** | **Roger** | **M** | **Collins/Humphries** | **16** | **75.4** | **79.6** | **9.5** | **1,881** | |
| **SAL*** | **Sherry** | **M** | **Collins/Seahorn** | **16** | **75.4** | **85.3** | **33.3** | **5,193** | |
| **SAL*** | **Sara** | **M** | **Collins/Coffey** | **16** | **75.4** | **88.6** | **40.5** | **6,338** | |
| SAL* | Barbara | M | | 16 | 75.6 | 78.9 | 9.6 | 1,696 | |
| **SAL*** | **Peggy** | **B** | **Emery/Collins** | **16** | **75.6** | **88.6** | **40.5** | **6,338** | |
| SAL* | Robert | P | | 16 | 76.0 | 81.8 | 16.4 | 2,985 | |

**Sherry**

**Matches SAL* on Chr 16 from 75.4 to 85.3 (33.3 cMs 5193 SNPs)**

○ Paternal ◉ Maternal ○ Both ○ IBS ○ ? Group: Collins/Seahorn

Collins, John (4) | Seahorn, Mahaley (4)

# WikiTree

- **Mission:** Our mission is to grow an accurate single family tree that connects us all and is freely available to us all.
- WikiTree balances privacy and collaboration so that living people can connect on one world tree to common ancestors.
- We privately collaborate with our close family members on modern family history. As we go back in time, the privacy controls open up. Collaboration on deep ancestors is between distant cousins who are serious about genealogical research, careful about sources, and willing to see their research validated or invalidated with DNA.

https://www.wikitree.com/wiki/Help:About_WikiTree

# WikiTree Website

# Dealing with Matches

- **Why your Match may not respond**
  - Your Match Only Wanted the Ethnicity Estimate
  - Your Match doesn’t know his Ancestry
  - Your Match doesn’t understand DNA results
  - The Match doesn’t think the relationship is possible
  - Your Relationship Isn't Close Enough
  - Your Match Didn't Get the Message
  - Your Message Didn't Say Enough
  - Your Match Is an Adoptee

# Dealing with Matches

- **Techniques to increase responses**
  - Give Some Attention to Your Profile
  - Use Your Database Page to Send Your Message
  - Don't Ramble or bombard your match with questions
  - Be Specific
  - Don't Include Your Entire Family Tree
  - Don't Take it Personally
  - Don't Stalk Your Matches
  - Offer To Help Your DNA Match

Thanks for joining us!