



# Exploring DNA Painter

Ken Waters

Dec 5, 2022



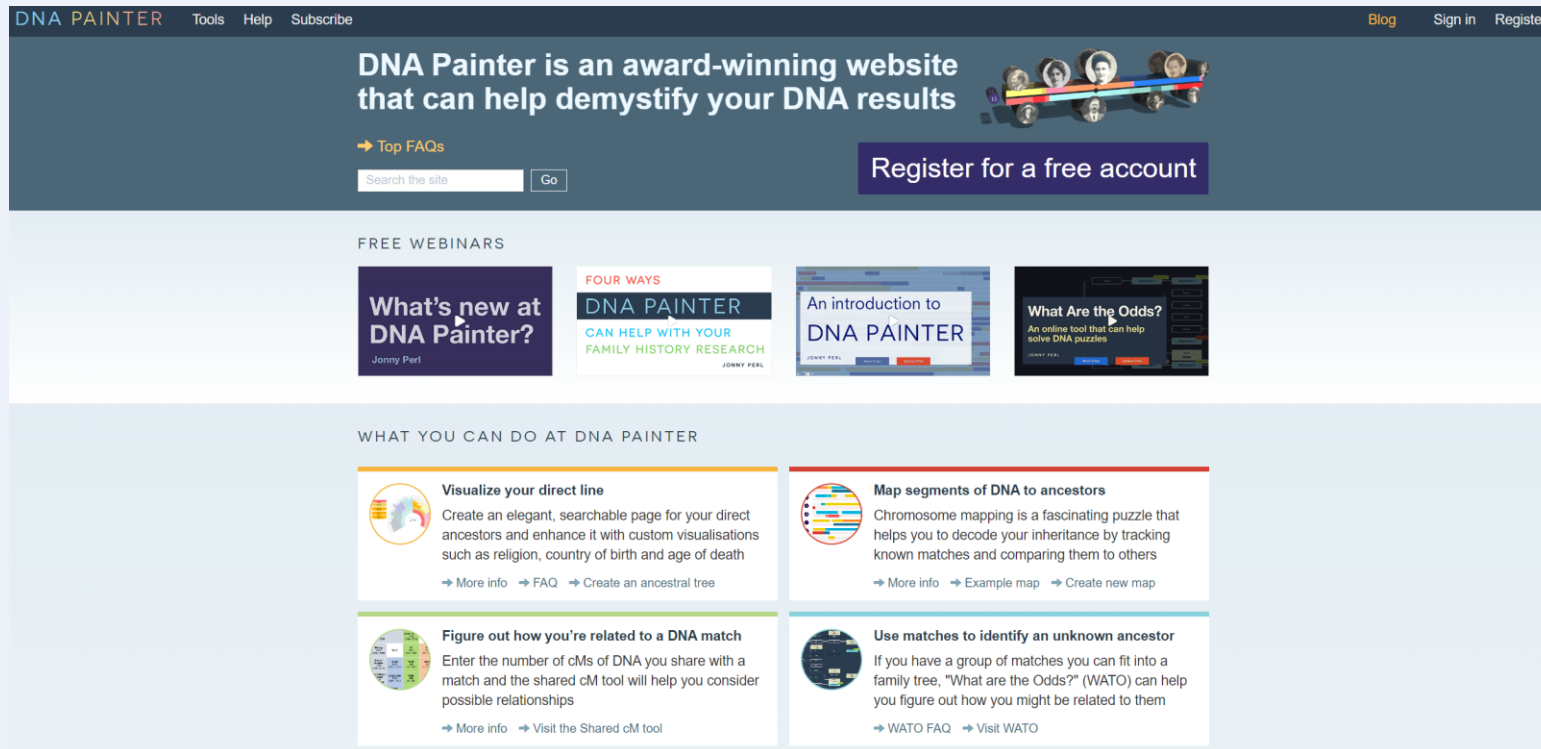
All slides and handouts can be found at:

<http://www.familytreeaz.com/Presentations/>



# What is “DNA Painter”?

- Website created in ~2017 by Jonny Perl



The screenshot shows the homepage of the DNA Painter website. At the top, there is a navigation bar with the logo "DNA PAINTER" and links for "Tools", "Help", "Subscribe", "Blog", "Sign in", and "Register". The main header features a dark blue background with the text "DNA Painter is an award-winning website that can help demystify your DNA results" and a "Register for a free account" button. Below this is a search bar and a "Go" button. The "FREE WEBINARS" section includes four cards: "What's new at DNA Painter?", "FOUR WAYS DNA PAINTER CAN HELP WITH YOUR FAMILY HISTORY RESEARCH", "An introduction to DNA PAINTER", and "What Are the Odds?". The "WHAT YOU CAN DO AT DNA PAINTER" section is divided into four cards: "Visualize your direct line", "Map segments of DNA to ancestors", "Figure out how you're related to a DNA match", and "Use matches to identify an unknown ancestor".

**DNA PAINTER** Tools Help Subscribe Blog Sign in Register

**DNA Painter is an award-winning website that can help demystify your DNA results**

→ Top FAQs

Search the site

**Register for a free account**

**FREE WEBINARS**

- What's new at DNA Painter?**  
Jonny Perl
- FOUR WAYS DNA PAINTER CAN HELP WITH YOUR FAMILY HISTORY RESEARCH**  
JONNY PERL
- An introduction to DNA PAINTER**  
JONNY PERL
- What Are the Odds?**  
An online tool that can help solve DNA puzzles  
JONNY PERL

**WHAT YOU CAN DO AT DNA PAINTER**

- Visualize your direct line**  
Create an elegant, searchable page for your direct ancestors and enhance it with custom visualisations such as religion, country of birth and age of death  
→ More info → FAQ → Create an ancestral tree
- Map segments of DNA to ancestors**  
Chromosome mapping is a fascinating puzzle that helps you to decode your inheritance by tracking known matches and comparing them to others  
→ More info → Example map → Create new map
- Figure out how you're related to a DNA match**  
Enter the number of cMs of DNA you share with a match and the shared cM tool will help you consider possible relationships  
→ More info → Visit the Shared cM tool
- Use matches to identify an unknown ancestor**  
If you have a group of matches you can fit into a family tree, "What are the Odds?" (WATO) can help you figure out how you might be related to them  
→ WATO FAQ → Visit WATO

# Jonny Perl, Creator

## AWARD

DNA Painter won the grand prize in the DNA Innovation contest at Rootstech 2018 in Salt Lake City, UT.



Upcoming Webinars

Webinar Library

Speakers



Speakers >

< PREV | NEXT >



## Jonny Perl

DNA TESTING • TECHNOLOGY > [DNAPainter.com](https://dnainter.com)

Jonny Perl is a genealogist, DNA enthusiast and web developer based in Swansea, Wales. He is the creator and founder of [dnainter.com](https://dnainter.com), an award-winning web application for chromosome mapping. Jonny has also collaborated with leading genetic genealogists to create other popular tools that help people around the world interpret the results of their autosomal DNA tests. His passion is in exploring new ways of visualising DNA and family tree information to help make it more inviting and user-friendly. Born in Belfast, Jonny has family roots in Ireland, England and Germany.


# Special Note

- There is SO much on the DNA Painter site
- Simply can't be covered completely in one hour but we will try to introduce the major elements that you can explore on your own

**SHARED CM TOOL** UPDATED

An interactive tool to show possible and probable relationships based on centimorgans shared

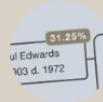
- Go to the tool
- New version where you can enter two values
- Beta version with updated probabilities



**COVERAGE ESTIMATOR** NEW

Estimate DNA coverage for an ancestor by indicating which of their descendants has tested. Save and share coverage trees.


- Read blog post
- Try the coverage estimator tool



**DISTINCT SEGMENT GENERATOR**


Copy and paste two or more sets of segments that multiple family members share with a single match. This tool will identify the distinct segments and return cM values for each along with the total cM.

- Read blog post
- Go to the tool



**WHAT ARE THE ODDS V1**


- Create a new probability tree
- Frequently asked questions
- Early prototype table version



**LIBRARY OF MATCHES**

A collection by Cody Ely of real example matches and shared segments from a wide variety of relationships, to be used for relationship prediction and reference.


- Read blog post
- Visit the map



**COMMON SEGMENT GENERATOR**

Copy and paste in two sets of segments. The tool will return just those that are common to all sets.


- Read blog post
- Go to the tool



**WHAT ARE THE ODDS? BETA V2**

A tool to use the shared cM from multiple matches to test out hypotheses


- Create a new probability tree
- Frequently asked questions



**CLUSTER AUTO PAINTER**

Takes your cluster file and segments files and generates a chromosome map with the segments grouped by cluster.


- Read blog post
- Go to the tool



**CM ESTIMATOR**

Enter the chromosome, start, and end positions and this tool will calculate an estimated number of centiMorgans (cM) to one decimal place.


- Read blog post
- Go to the tool



**ANCESTRY CHROMOSOME PAINTER SEGMENTS** NEW

Convert your AncestryDNA 'Chromosome Painter' segments into chromosome, start and stop points that you can use in your chromosome map


- Read blog post
- Visit the tool



**INFERRED SEGMENT GENERATOR**

Copy and paste the segments that you and a close relative share with a DNA match, and this tool will output just the segments that you do not share with the match.

- Read blog post
- Go to the tool



**INDIVIDUAL MATCH FILTER**

Paste in segments, and the tool will return the segments and total filtered cM according to the criteria you set


- Go to the tool



**BUCKETING**

A tool that can help group matches into maternal and paternal (or link them to a common ancestor) by filtering a list of segments using other lists of segments or matches from known relatives


- Read blog post
- Try the bucketing tool



**SHARED CM INVESTIGATOR**

Paste multiple sets of segments that siblings share with a match and this tool will estimate the total amount of DNA the parent is likely to have shared with this match.


- Read blog post
- Go to the tool



**CLUSTER FORMATTER**

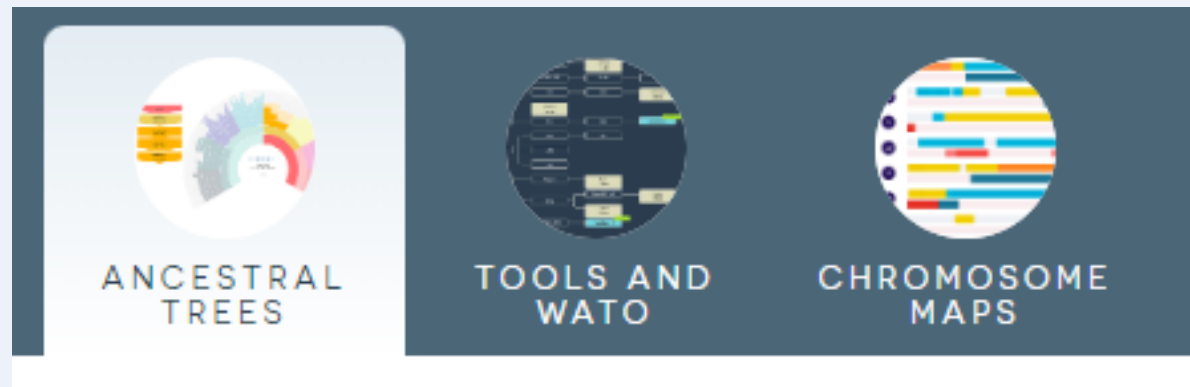
A simple tool to extract a CSV of clusters and matches from your Genetic Affairs or MyHeritage autocluster output.

- Go to the tool



# What I will cover

- Shared centiMorgan Project
- WATO (What are the odds?)
- DNA Painter/Chromosome Mapping
- Ancestral Trees
- Cluster Auto-Painter



# First, register for a new free account

- <https://dnainter.com/>

## DNA PAINTER

### Register

#### Name and email



Please double-check that your email address is correct!

#### Username

[Suggest]

Please specify a value for **Username**.

#### Password



I have read and agree to the DNA Painter terms and conditions.

Sign me up

Already have an account? Sign in here.

Login problems? Try resetting your password.

**Important:** DNA Painter is \*not\* a site where you can upload your raw DNA. For more info please read the help page.

# Optional Subscription

- Try it first for free but subscription may be useful as you learn more ways to use the service
- \$55/year

DNA Painter is free, but you need a subscription if you want to:

- Create additional chromosome maps
- Benefit from bulk import of shared DNA segments
- Create additional trees or multiple dimensions
- Import all generations of your direct line from your GEDCOM file

You can now **subscribe to DNA Painter** and unlock the power of visualization via trees and chromosome mapping:

- **Create multiple trees** — A new tree can be created for any ancestor in your tree with a click, allowing you to view \*their\* DNA inheritance paths and pedigree collapse.
- **Experiment with different chromosome mapping approaches** — Have up to 50 chromosome mapping profiles
- **Identify trends and common matches** — Access subscriber-only bulk processing tools allowing import of custom segment lists and match lists from MyHeritage, 23andMe and FamilytreeDNA
- **Bulk-add new matches** — So long as you retain the match name, the import will skip already-imported matches and just add new ones
- **Enjoy extra flexibility** — Assemble groups of matches in your favourite spreadsheet application and import these directly into a DNA Painter chromosome map

All for the price of a good cup of coffee each month!

***Subscriptions are \$55 for 12 months.***

➔ [Frequently asked questions about subscriptions](#)

Subscribe now



# Shared centiMorgan Tool

# Shared centiMorgan Tool

- **My #1, most-used tool on DNAPainter**
- Derived from the Shared centiMorgan Project that was developed by Blaine Bettinger
- Crowd sourced values from DNA test takers matching centiMorgan match values with relationship



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## THE GENETIC GENEALOGIST

ADDING DNA TO THE GENEALOGIST'S TOOLBOX

### Version 4.0! March 2020 Update to the Shared cM Project!

Blaine Bettinger 27 March 2020 58 Comments

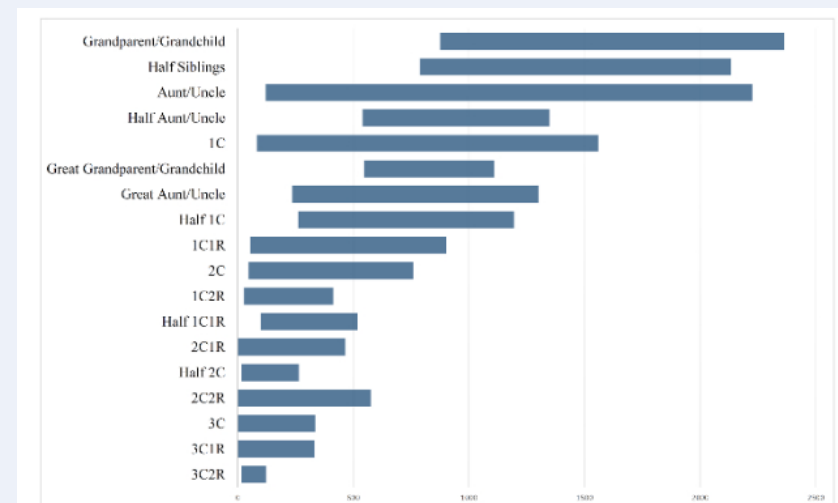
The Shared cM Project (ScP) is a collaborative data collection and analysis project created to understand the ranges of shared cM associated with various known relationships. The ScP has been very successful, with more than 60,000 submissions from amazing genealogists like YOU! To add your data, the Submission Portal is [HERE](#). I am always collecting data, and hopefully the next update will have more than 100,000 submissions!

**The full PDF for Version 4.0 of the Shared cM Project is here and it is ESSENTIAL that you read the full PDF for all the details from the project: The Shared cM Project Version 4.0 (March 2020).**

Today, the most recent version of the ScP, Version 4.0, goes live. I've taken nearly 60,000 submissions and analyzed the data for almost 50 different relationships. For each relationship the 100s or 1000s of submissions were analyzed to remove outliers, to provide minimum, maximum, average, and standard deviation values, and to generate a histogram for the distribution of the submissions. Here are some of the other differences between this new Version 4.0 and the previous version (click to enlarge):

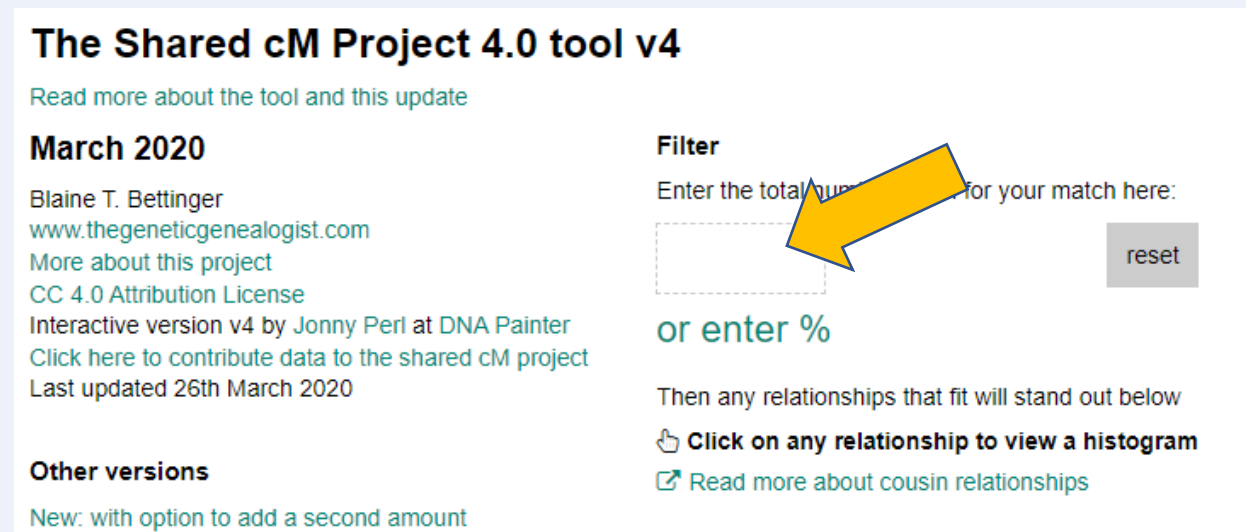
META

- Log in
- Entries feed
- Comments feed
- WordPress.org



# DNA Painter Shared cMs Project

- Link: <https://dnainter.com/tools/sharedcmv4> (be sure to bookmark this as you'll use it over and over again!)
- Click in the “Filter” box and enter the cMs value that you want to investigate



**The Shared cM Project 4.0 tool v4**

[Read more about the tool and this update](#)

**March 2020**

Blaine T. Bettinger  
[www.thegeneticgenealogist.com](http://www.thegeneticgenealogist.com)  
[More about this project](#)  
[CC 4.0 Attribution License](#)  
Interactive version v4 by Jonny Perl at DNA Painter  
[Click here to contribute data to the shared cM project](#)  
Last updated 26th March 2020

**Other versions**

[New: with option to add a second amount](#)

**Filter**

Enter the total number of cM for your match here:

or enter %


Then any relationships that fit will stand out below


[Click on any relationship to view a histogram](#)

[Read more about cousin relationships](#)


# Shared cM Project


- As an example from my DNA kit, I have a 941 cM match; this is a known 1<sup>st</sup> cousin
- Entering 941 cMs indicates a small number of possibilities
- If I click on the “1C” in the list I will get a histogram of possibilities



**M.C.**  
Managed by 

**1st cousin**  
941 cM | 13% shared DNA  
Paternal side

 Public linked tree  
8 People

 Common ancestor

[View match](#)

**Filter**

Enter the total number of cM for your match here:

reset

or enter %

Then any relationships that fit will stand out below

[Click here for a shareable link to the cM amount above](#)

**Most distant common ancestors**

Assuming no [pedigree collapse](#) or [endogamy](#), and that you're related in just one way, the **furthest** back you might need to go to find common ancestors for a match of 941cM is **Great-Grandparent level** or generation 4 on your pedigree chart.

*The connection may be closer. Also, depending on your family, this match could be a close younger generation relative, such as the descendant of your sibling.*

**Relationship probabilities (based on stats from [The DNA Geek](#))**

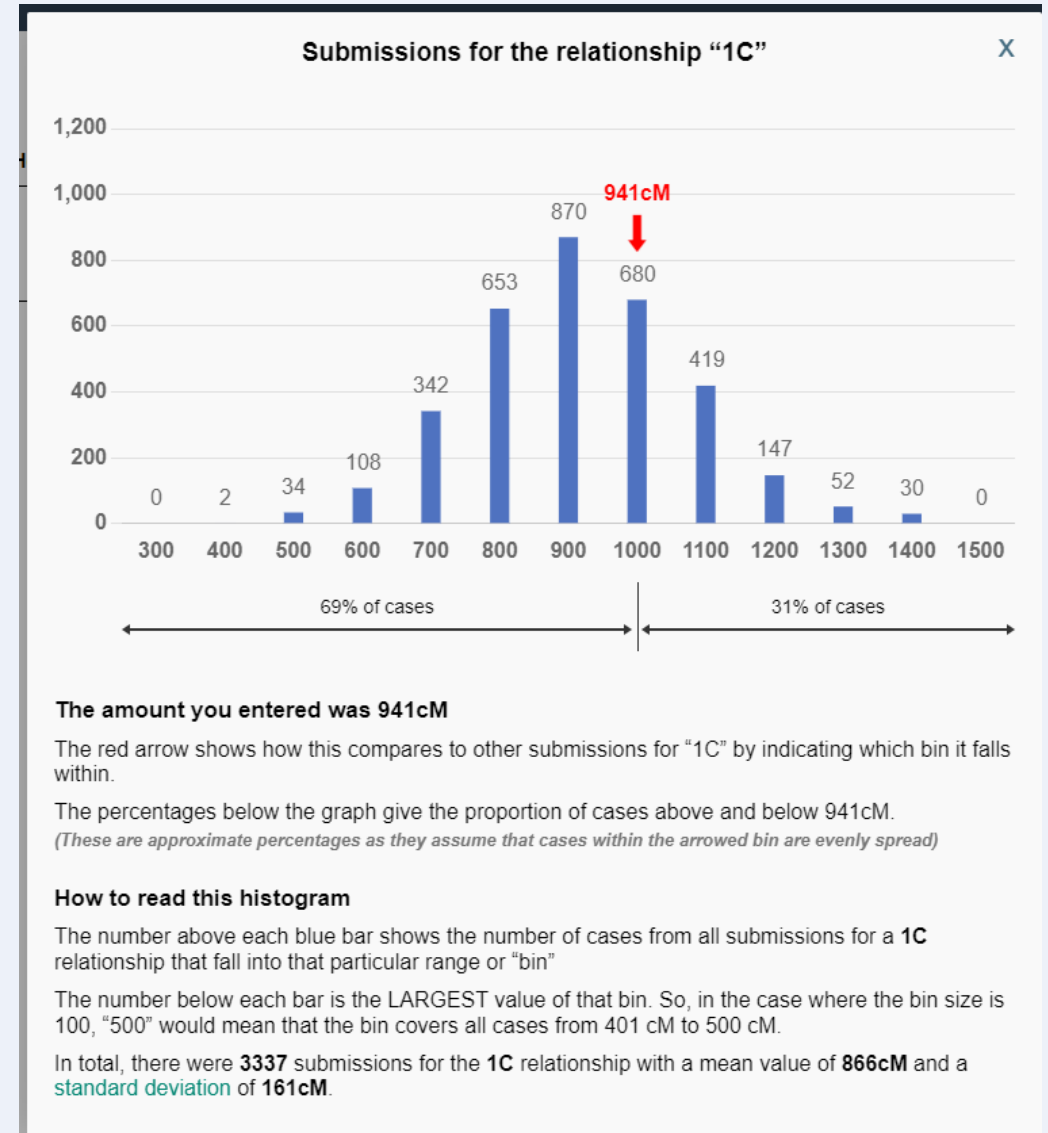
[New: View these relationships in a](#)

<b>99%</b>	Great-Grandparent / Great-Aunt / Uncle Half Aunt / Uncle 1C Half Niece / Nephew Great-Niece / Nephew Great-Grandchild
<b>0.58%</b>	Great-Great-Aunt / Uncle † Great-Great-Niece / Nephew † Half Great-Aunt / Uncle † Half Great-Niece / Nephew † Half 1C 1C1R

† this relationship has a positive probability for 941cM in thednageek's table of probabilities, but falls outside the bounds of the recorded cM range (99th percentile)

# Shared cM Project

- Clicking on the “1C” label yields a useful histogram indicating where typical 1<sup>st</sup> cousins would be on the spectrum
- In this case, 941 cMs is clearly well near the center of the spectrum



# Shared cMs Project – Applied Example

- I have an unknown great-grandparent mystery that I've been working for years to solve
- My maternal grandmother has an unknown NPE father
- Looking at my mom's DNA test matches I see the strongest (closest) match on that unknown line at 178 cMs

The screenshot shows a DNA match profile for a person named Joan Anita Craddock and another individual whose name is redacted. The relationship is identified as a 2nd - 3rd Cousin on the maternal side, with 3% shared DNA (178 cM) across 11 segments. The interface includes buttons for 'Connect to tree', 'Message', and 'Edit Relationship', along with an 'Add/edit groups' option at the bottom.

**Joan Anita Craddock and [redacted]**

2nd - 3rd Cousin | Maternal side  
3% shared DNA: 178 cM across 11 segments

Connect to tree   Message   Edit Relationship

★ ● ⊕ Add/edit groups

# Shared cMs Project – Applied Example

- Entering the cMs value of 178 cMs into the tool
- I see a probability chart that can help me identify the most likely relationship that a 178 cMs match would have
- When I eliminate certain options due to generation difference it can really narrow down the list
- In this case I believe this match is most likely one generation younger than Mom
  - I've reduced the number of possibilities from 23 down to 5!

## The Shared cM Project 4.0 tool v4

[Read more about the tool and this update](#)

### March 2020

Blaine T. Bettinger

[www.thegeneticgenealogist.com](http://www.thegeneticgenealogist.com)

[More about this project](#)

[CC 4.0 Attribution License](#)

Interactive version v4 by Jonny Perl at DNA Painter

[Click here to contribute data to the shared cM project](#)

Last updated 26th March 2020

#### Important

- For relationships more distant than Half 2C, the averages were determined only for relationships in which DNA was shared.
- The more distant a relationship, the more likely it is that you won't share DNA at all ([read more](#))
- These statistics do not cater for pedigree collapse or endogamy

#### Other versions

New: with option to add a second amount

Beta with updated probabilities

With editable boxes

Shared cM 3.0 (2017) version

#### Filter

Enter the total number of cM for your match here:

or enter %

Then any relationships that fit will stand out below

[Click here for a shareable link to the cM amount above](#)

#### Most distant common ancestors

Assuming no [pedigree collapse](#) or [endogamy](#), and that you're related in just one way, the **furthest** back you might need to go to find common ancestors for a match of 178cM is **4th-Great-Grandparent level** or generation 7 on your pedigree chart.

**The connection may be closer.**

#### Relationship probabilities (based on stats from [The DNA Geek](#))

New: [View these relationships in a tree](#)

51%	<del>Ha 2C</del> <b>2C1R</b> <del>Ha 1C2R</del> <del>1C1R</del>
36%	Half GG-Aunt / Uncle <del>1C</del> <b>Half 1C1R</b> <del>1C2R</del> Half GG-Niece / Nephew
10%	<del>Ha 1C3R †</del> <del>3C</del> <b>Half 2C1R</b> <del>2C2R</del>
2%	<del>Great-Great-Aunt / Uncle †</del> <del>Great-Great-Niece / Nephew †</del> <del>Half Great-Aunt / Uncle †</del> Half Great-Niece / Nephew † <del>Ha 1C</del> <b>1C1R</b>
2%	<del>2C1R †</del> <del>Half 2C2R †</del> <del>Ha 3C †</del> <b>3C1R</b>

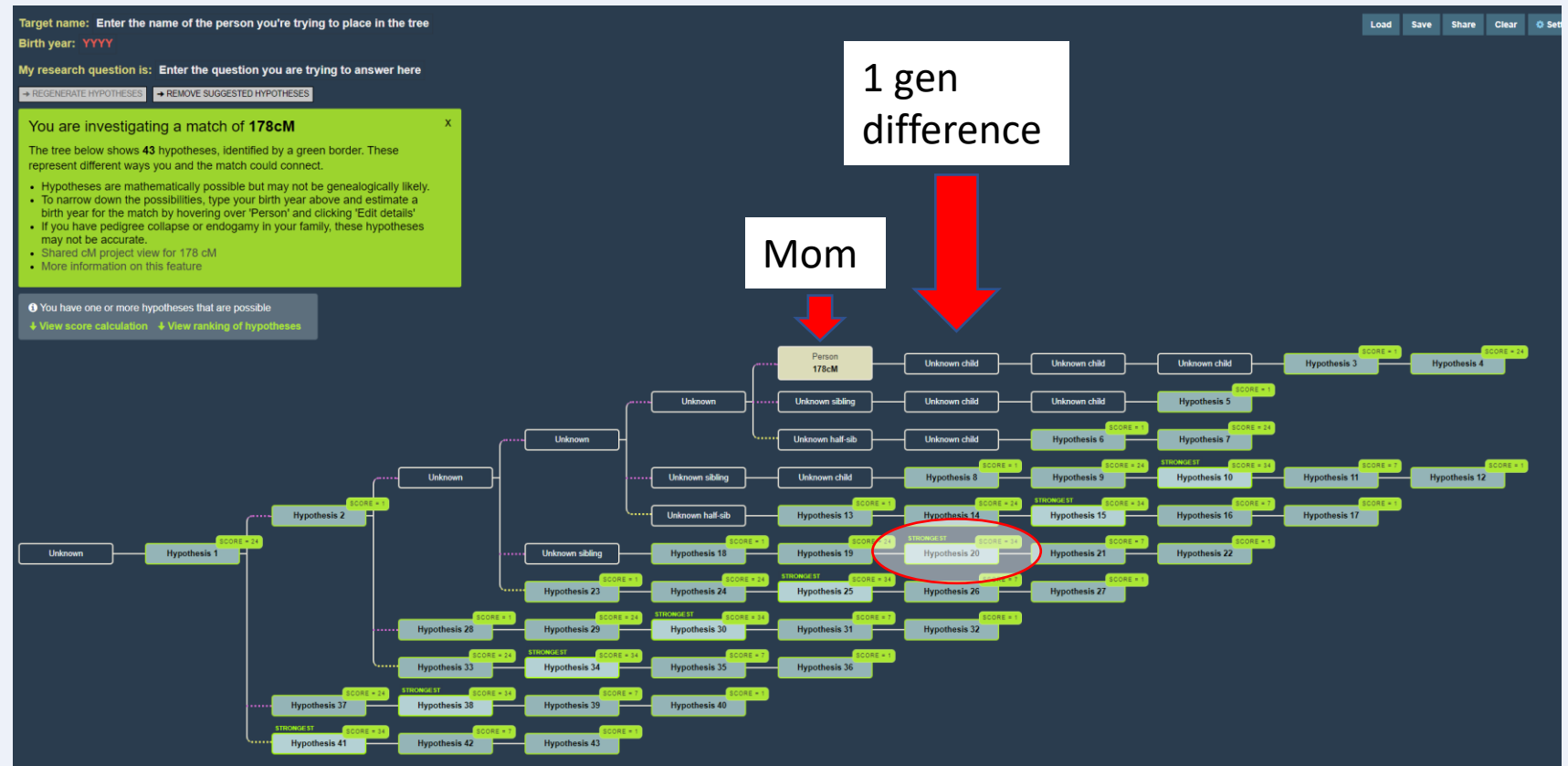
† this relationship has a positive probability for 178cM in thednaageek's table of probabilities, but falls outside the bounds of the recorded cM range (99th percentile)

# Integration between the shared cM tool and WATO



**Relationship probabilities (based on stats from The DNA Geek)**  
New: View these relationships in a tree

- If I click on view in tree I get a probabilities table
- Identifies 2C1R as most likely for one generation difference





WATO (What are the odds?)

# WATO (What are the odds?)

- This is an advanced tool that can't be covered fully in this presentation --- I strongly encourage you to watch one of Jonny Perl's videos to explain how to use it:

<https://familytreewebinars.com/webinar/what-are-the-odds-an-online-tool-that-can-help-solve-dna-puzzles/>



The screenshot shows a webpage from Legacy Family Tree Webinars. The header includes the site logo and navigation links for 'Upcoming Webinars', 'Webinar Library', and 'Speakers'. The main content area features a video player with a title '‘What are the Odds?’ An online tool that can help solve DNA puzzles'. Below the title, it indicates the date 'Jun 3, 2020', '57.5K views', and 'Advanced' level. There are social media sharing buttons for Facebook, Twitter, and a general share button, along with a 'Like 318' button. The video player itself shows a grid of many small, colorful icons representing diverse people, with a large white play button in the center. At the bottom of the page, there is a 'Syllabus' link and two buttons: 'Log in' and 'Join now'.

# My Example of WATO

- Starting with:
- Using my unknown NPE great-grandfather
- My mom's top match in that line is a 178 cMs match (as noted before)

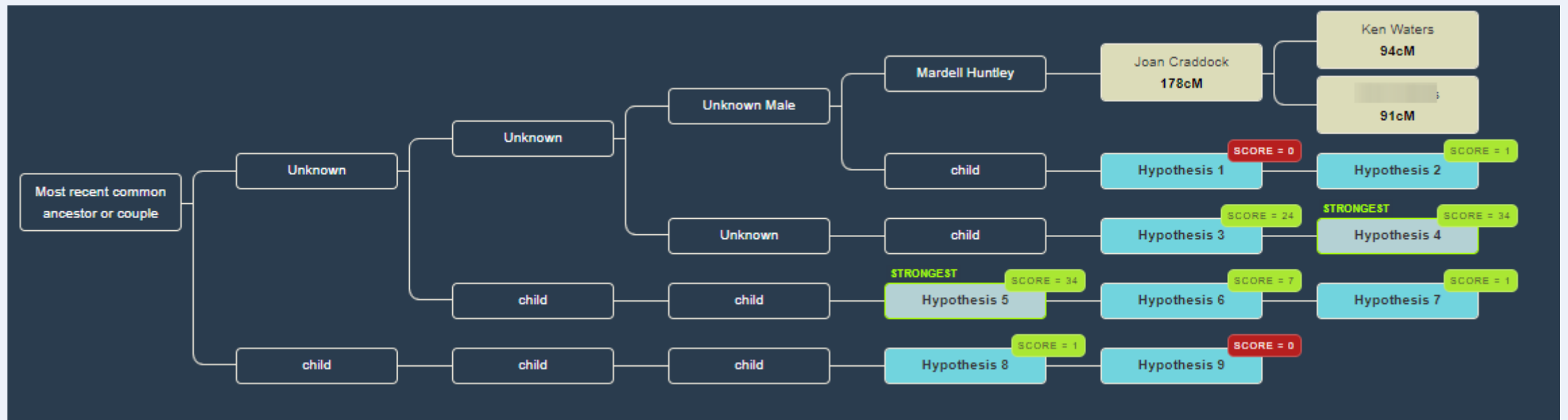
The screenshot shows a DNA match profile for Joan Anita Craddock and [redacted]. The profile includes a photo of Joan Anita Craddock and a blurred photo of the match. The relationship is identified as "2nd - 3rd Cousin | Maternal side" with "3% shared DNA: 178 cM across 11 segments". Action buttons include "Connect to tree", "Message", and "Edit Relationship". Below the profile, there are tabs for "Trees", "Ethnicity", and "Shared Matches". A filter bar shows options for "Unviewed", "Common ancestors", "Messaged", "Notes", "Trees", and "Groups". The "Shared Matches" section is titled "Distant Family" and lists two matches:

Match Name	Relationship	Shared DNA	Tree Status	Do you recognize them?
[redacted]	4th - 6th Cousin Maternal side	36 cM   < 1% shared DNA	No Trees	Yes / Learn more
[redacted]	4th - 6th Cousin Maternal side	25 cM   < 1% shared DNA	Private unlinked Tree	Yes / Learn more

Additional notes for the second match: "All Irish. See tree built for her. In contact."

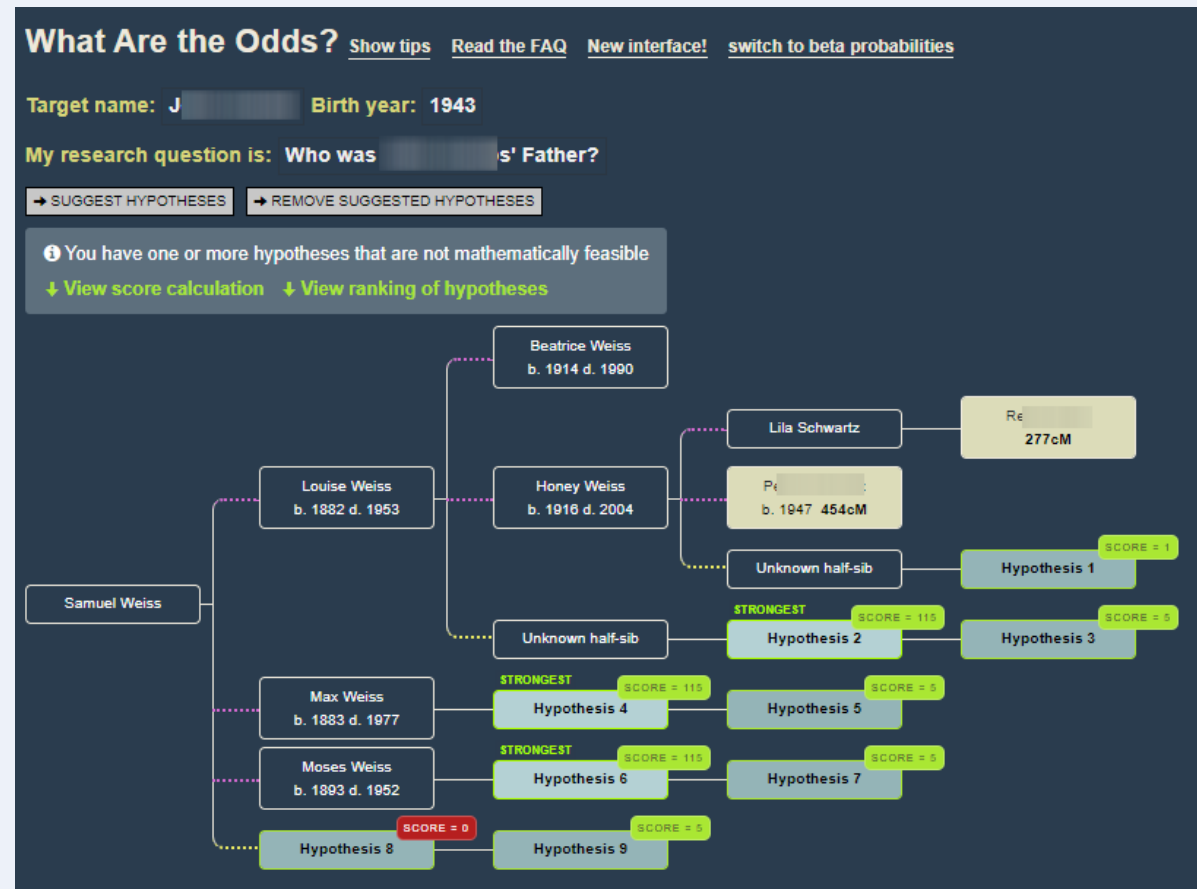
# WATO

- This was a WATO to estimate where that 178 cM match fits into her tree
- Similar to the previous illustration it predicts that the greatest probability is for the unknown person to be a 2<sup>nd</sup> cousin once removed



# WATO

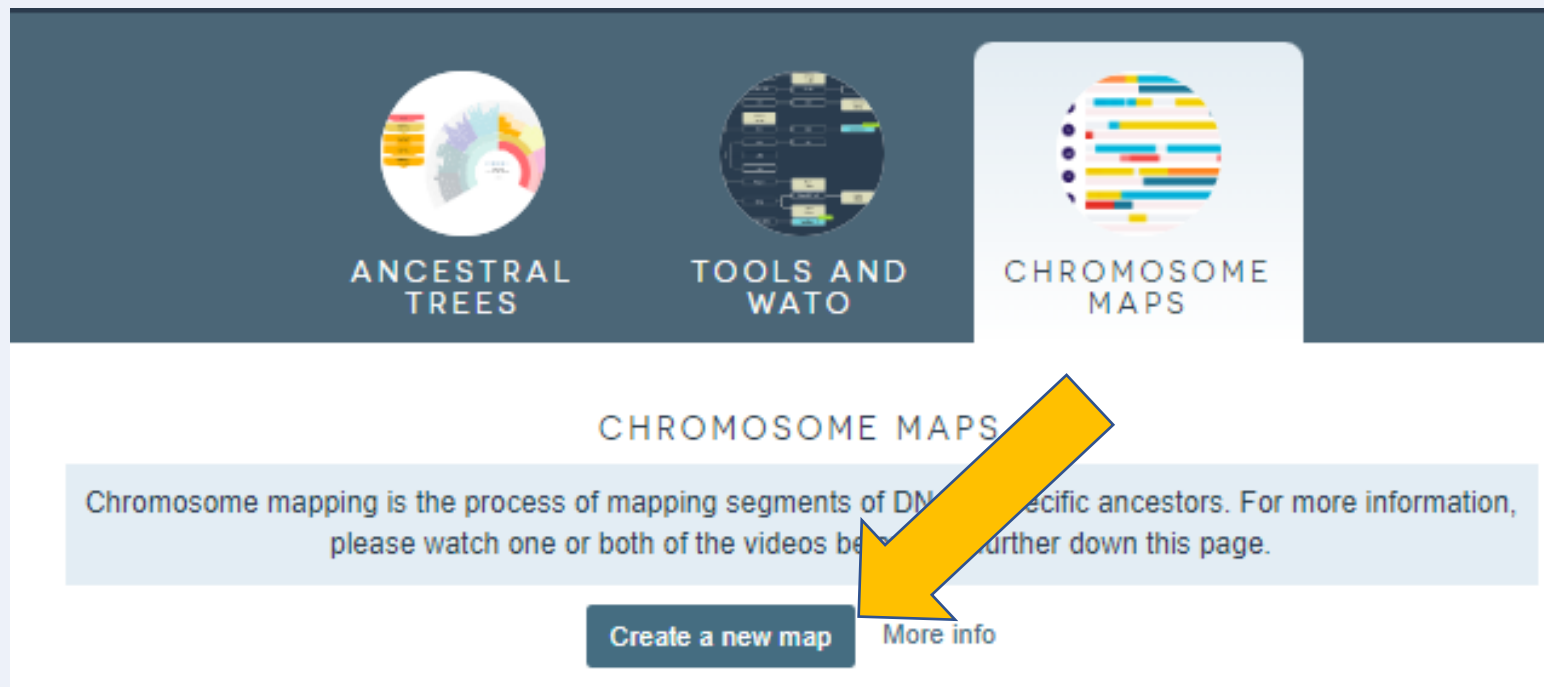
- Another example helping a client identify his birth father using two DNA matches



# Chromosome Mapping

# Chromosome Map

- Click on the Chromosome Maps tab and then “Create a new map”



ANCESTRAL TREES      TOOLS AND WATO      CHROMOSOME MAPS

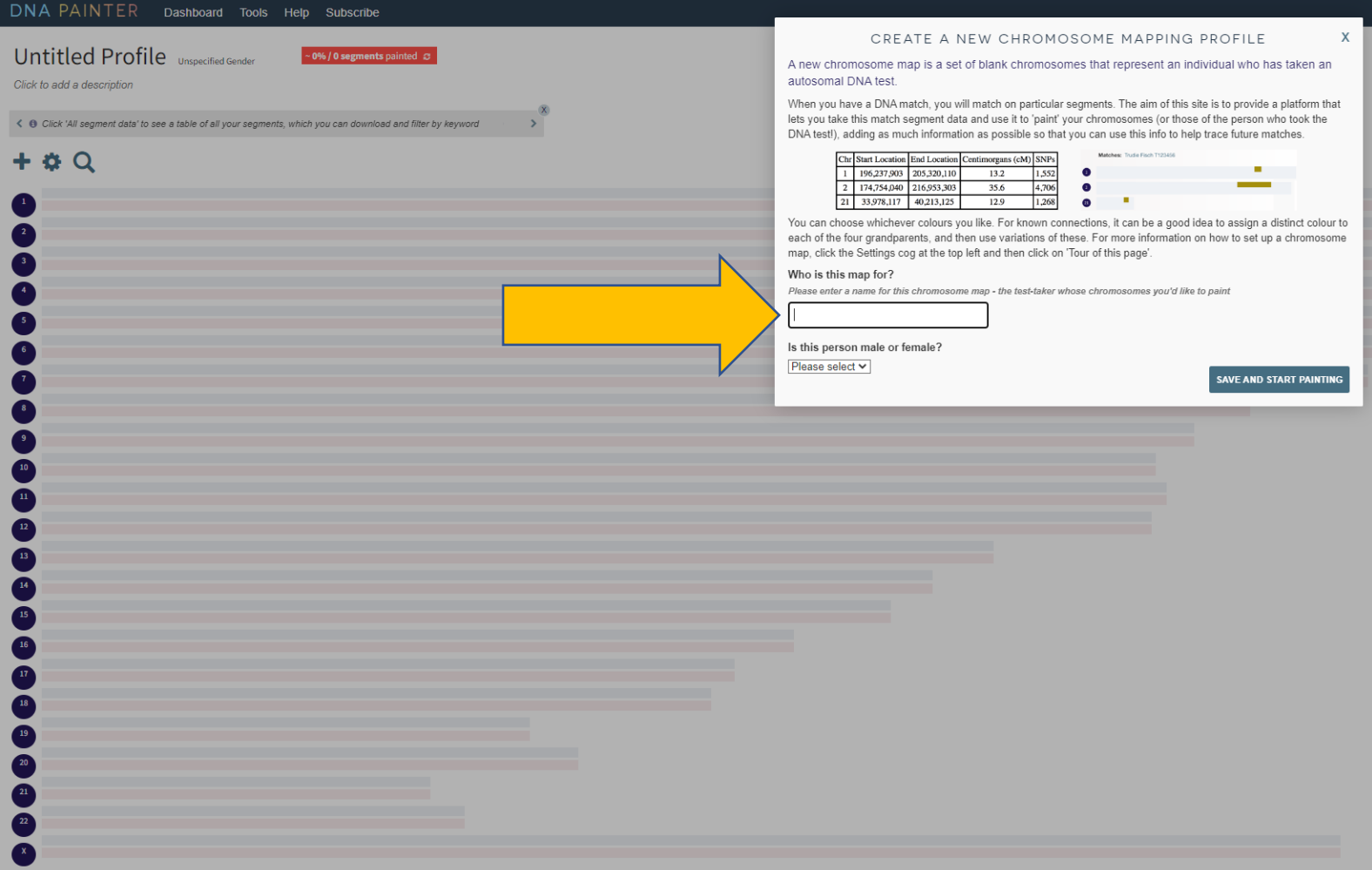
CHROMOSOME MAPS

Chromosome mapping is the process of mapping segments of DNA to specific ancestors. For more information, please watch one or both of the videos below further down this page.

Create a new map      More info

# Chromosome Map

- It will first open to a “blank” chromosome map
- First step, identify the DNA test taker



DNA PAINTER Dashboard Tools Help Subscribe

Untitled Profile Unspecified Gender - 0% / 0 segments painted

Click to add a description

Click 'All segment data' to see a table of all your segments, which you can download and filter by keyword

+ ⚙️ 🔍

Chr	Start Location	End Location	Centimorgans (cM)	SNPs
1	196,237,903	205,320,110	13.2	1,552
2	174,754,040	216,953,303	35.6	4,706
21	33,978,117	40,213,125	12.9	1,268

Matches: Tracie Fitch T123456

You can choose whichever colours you like. For known connections, it can be a good idea to assign a distinct colour to each of the four grandparents, and then use variations of these. For more information on how to set up a chromosome map, click the Settings cog at the top left and then click on 'Tour of this page'.

Who is this map for?  
Please enter a name for this chromosome map - the test-taker whose chromosomes you'd like to paint

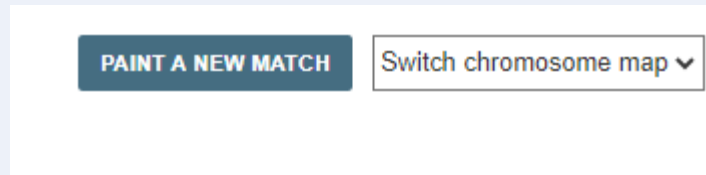
Is this person male or female?  
Please select ▼

SAVE AND START PAINTING

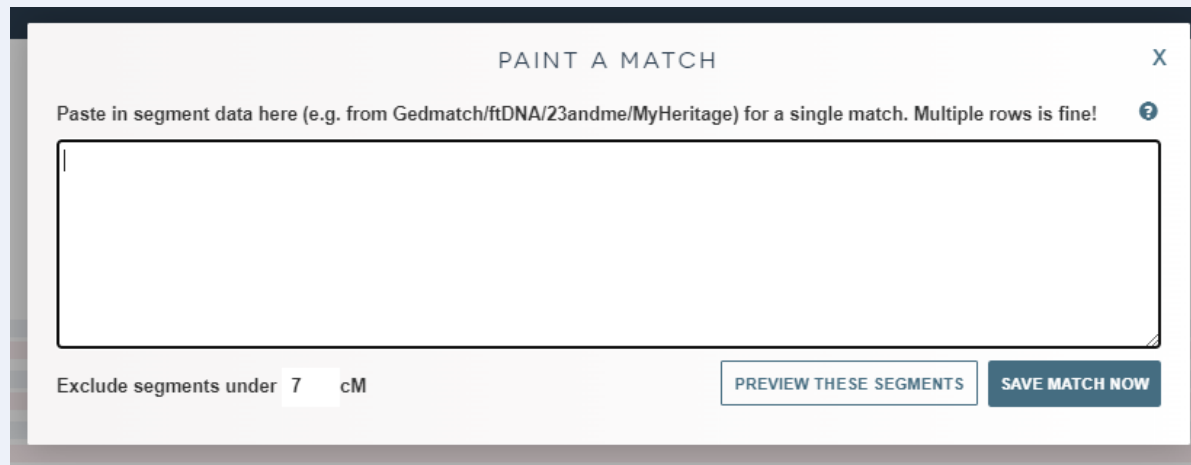


# Chromosome Map

- Click “Paint a new match”



- By far the easiest way to do this is to copy in segment data for a match from either GEDMatch, FTDNA, 23andMe, or MyHeritage. (Sorry Ancestry fans....Ancestry does not provide segment data)

A screenshot of a web form titled "PAINT A MATCH" in a window. The window has a close button "X" in the top right. Below the title is a text input field with a placeholder: "Paste in segment data here (e.g. from Gedmatch/ftDNA/23andme/MyHeritage) for a single match. Multiple rows is fine!". Below the input field is a label "Exclude segments under 7 cM". At the bottom right are two buttons: "PREVIEW THESE SEGMENTS" and "SAVE MATCH NOW".

# Chromosome Map

- For this example I am using my kit on MyHeritage and using my match to a 1<sup>st</sup> cousin once removed (my great-grandparents are her grandparents). 100% of her ancestral heritage was from the Azores
- 19 segments for a total of 476 cMs

Estimated relationships

Great-aunt, 1st cousin once removed - 2nd cousin

DNA Match quality

6.7% (476.3 cM)  
Shared DNA

19

Shared segments

65.5 cM

Largest segment



This is the chromosome depiction from My Heritage for this match



# Chromosome Map

- Open the spreadsheet and select the rows and columns with the segment data and “copy” (ctrl-c) the data
- In the DNA Painter window “paste” (ctrl-v) those data in and click “save match now”
- DNA Painter is smart enough to know how to recognize and parse the pasted information from several different sources!



	Name	Mat	Chromosc	Start Loca	End Locati	Start RSID	End RSID	Centimorg	SNPs
1	Ken Wate Jun		1	2.26E+08	2.49E+08	rs2749696	rs1204328	42.7	14506
2	Ken Wate Jun		2	38171937	66242561	rs6544117	rs1748144	27.5	16256
3	Ken Wate Jun		2	1.06E+08	1.18E+08	rs1086506	rs1159310	11.2	5120
4	Ken Wate Jun		4	21184914	25941802	rs1364832	rs7441610	7.6	2816
5	Ken Wate Jun		5	1.65E+08	1.81E+08	rs256409	rs1456798	33.3	10111
6	Ken Wate Jun		6	17548930	39149140	rs7283546	rs1465570	22.5	23168
7	Ken Wate Jun		6	1.25E+08	1.38E+08	rs1115427	rs679670	14.3	6528
8	Ken Wate Jun		7	490409	6495017	rs1476900	rs7792987	10.8	3712
9	Ken Wate Jun		7	21830640	28780724	rs1027610	rs7794299	9.4	4480
10	Ken Wate Jun		8	1022799	16593803	rs1009080	rs1198590	33.6	14208
11	Ken Wate Jun		11	26798642	1.06E+08	rs1169108	rs7110120	65.5	37504
12	Ken Wate Jun		12	63911893	68867330	rs7516255	rs1049230	6.9	2560
13	Ken Wate Jun		13	19020095	32086306	rs1408718	rs277150	27.7	8704
14	Ken Wate Jun		17	70722955	81151539	rs9889940	rs3528414	27.2	7423
15	Ken Wate Jun		19	397531	5348933	rs4897971	rs7259497	16.7	3328
16	Ken Wate Jun		20	5801710	47465681	rs1151950	rs6090915	52.8	22144
17	Ken Wate Jun		21	9922018	31432252	rs3696988	rs1406257	30.7	9728
18	Ken Wate Jun		22	17661372	22520548	rs7338592	rs2330014	13.9	2688
19	Ken Wate Jun		22	43809158	51214796	rs8135509	rs1906390	22	6527
20									
21									
22									

PAINT A MATCH

Paste in segment data here (e.g. from Gedmatch/ftDNA/23andme/MyHeritage) for a single match. Multiple rows is fine!

Ken Waters	13	19020095	32086306	rs140871821	rs277150	27.7	8704
Ken Waters	17	70722955	81151539	rs9889940	rs35284141	27.2	7423
Ken Waters	19	397531	5348933	rs4897971	rs7259497	16.7	3328
Ken Waters	20	5801710	47465681	rs1151950	rs6090915	52.8	22144
Ken Waters	21	9922018	31432252	rs369698875	rs140625736	30.7	9728
Ken Waters	22	17661372	22520548	rs73385926	rs2330014	13.9	2688
Ken Waters	22	43809158	51214796	rs8135509	rs190639024	22	6527

Exclude segments under 7 cM

PREVIEW THESE SEGMENTS SAVE MATCH NOW

# Chromosome Map

- Answer a few more questions
- Of course it's much better if you know how you are related to this person
- Very important: be sure to identify if this match is maternal or paternal (otherwise it will paint the segment on both sides)



SAVE MATCH X

We found 18 segments in your match data (excluding segments under 7cM).

Describe your connection to this match:

I know how I'm connected to this match

I don't yet know how I'm connected to this match.

Enter the name of your DNA match

Optional – This is just so you can identify the source of this segment in future. You could also enter their DNA kit number or username.

+ Add details about these match segments

If you know how you are connected, you can label these segments with the name of the ancestor you got them from.

All segments will be assigned to the group you choose below but you can assign segments individually later by clicking on them and choosing 'Edit segment'

+ More info

Enter your ancestor's name (or the name of the couple)

If you have multiple ancestors with the same name, you might like to include their birth year.

Is this match on your mother's side or your father's?

Each pair has one chromosome from your father and one from your mother. Do these segments look like they're from the maternal or paternal side? (if you're not sure, you can just select "Not sure")

Colour

Notes for this group

Optional - add notes to describe this ancestor or group

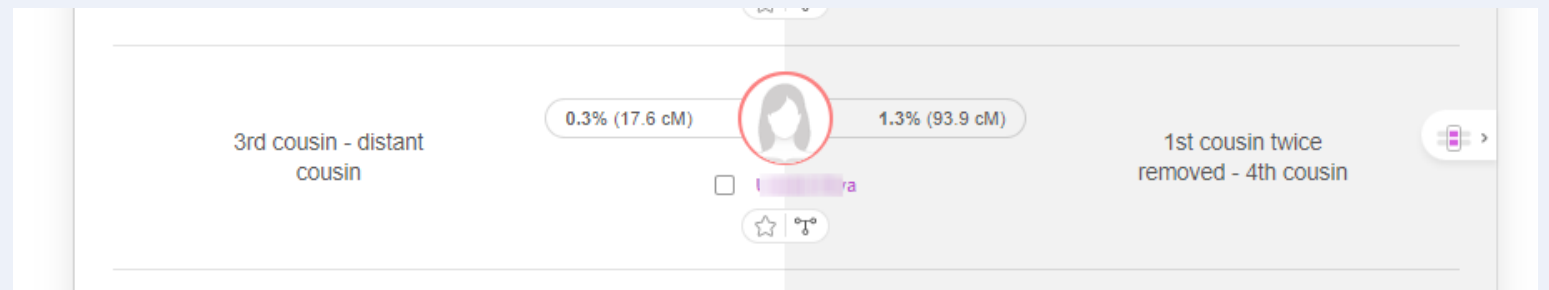
SAVE MATCH

# Chromosome Map



# Chromosome Map

- Now, looking at the shared matches for my 1C1R I find another common match that I'd like to try painting in (note: I do not know how I am related to her)
- This is a 17.6 cM match to me and a 93.9 cM match to my 1C1R

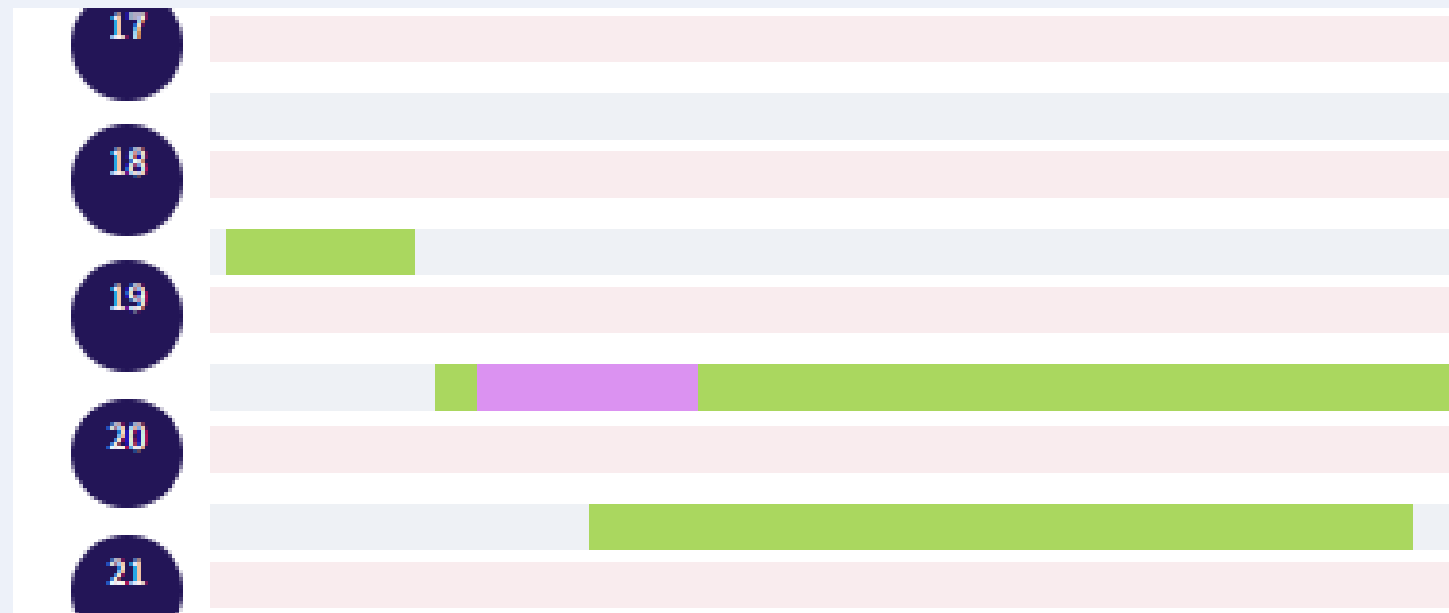






# Chromosome Map

- Now this new match is painted in magenta color (you can choose what colors you want) and is overlaid on top of a segment on Chr 20 that I shared with my 1C1R
- True triangulation which infers common ancestors





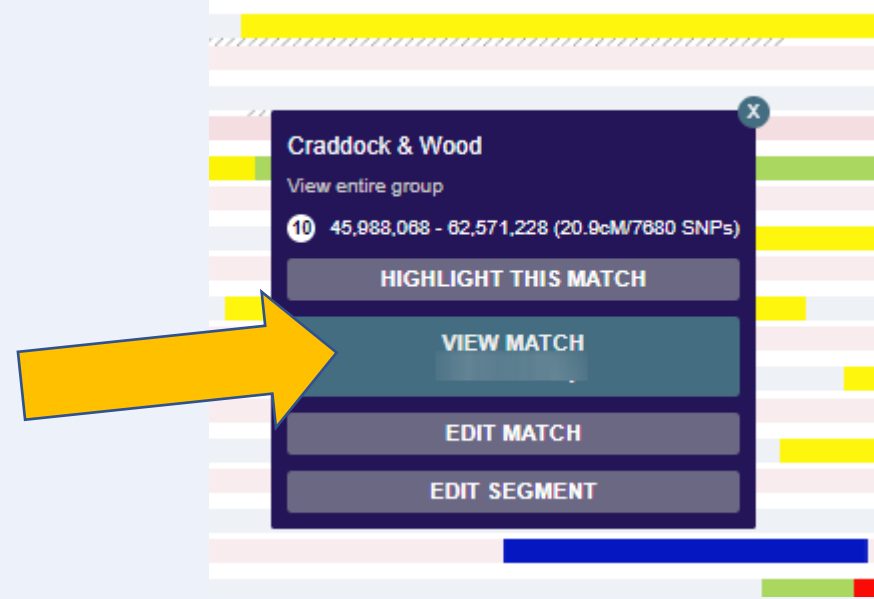
# Chromosome Map

- Resulting map
- Green=my 1C1R, magenta=unknown cousin, red=my 2C1R



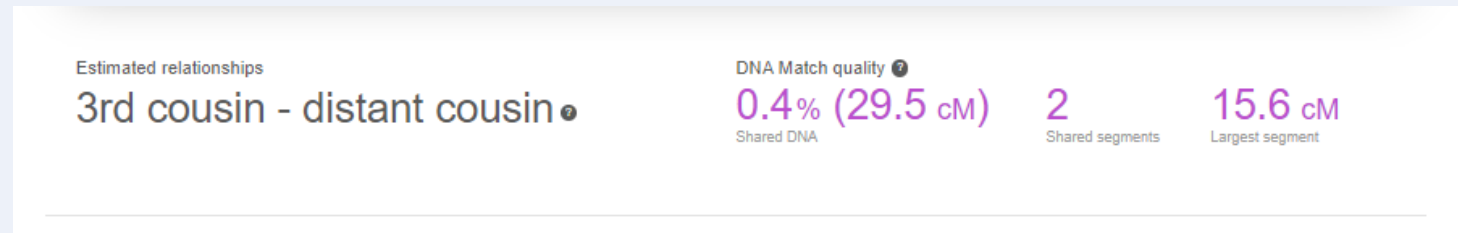
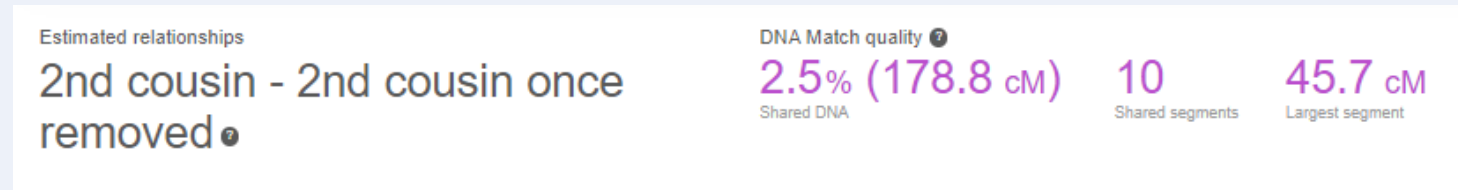
# Chromosome Map

- By clicking on one segment and selecting “view match” I can easily see the overlapping segments which is confirmation of what we call “triangulation”



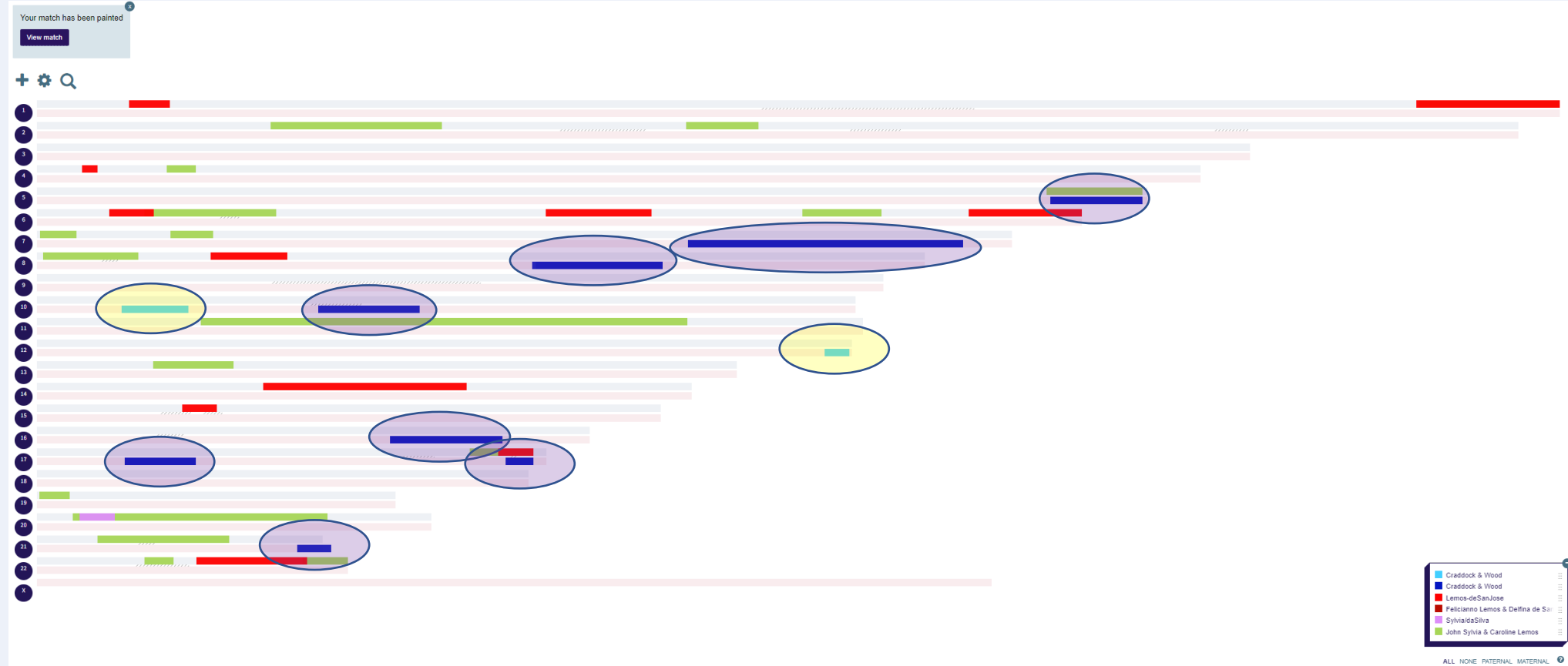
# Chromosome Map

- Now, some maternal matches
  - A 2C and
  - an unknown cousin, likely a 3C or 3C1R



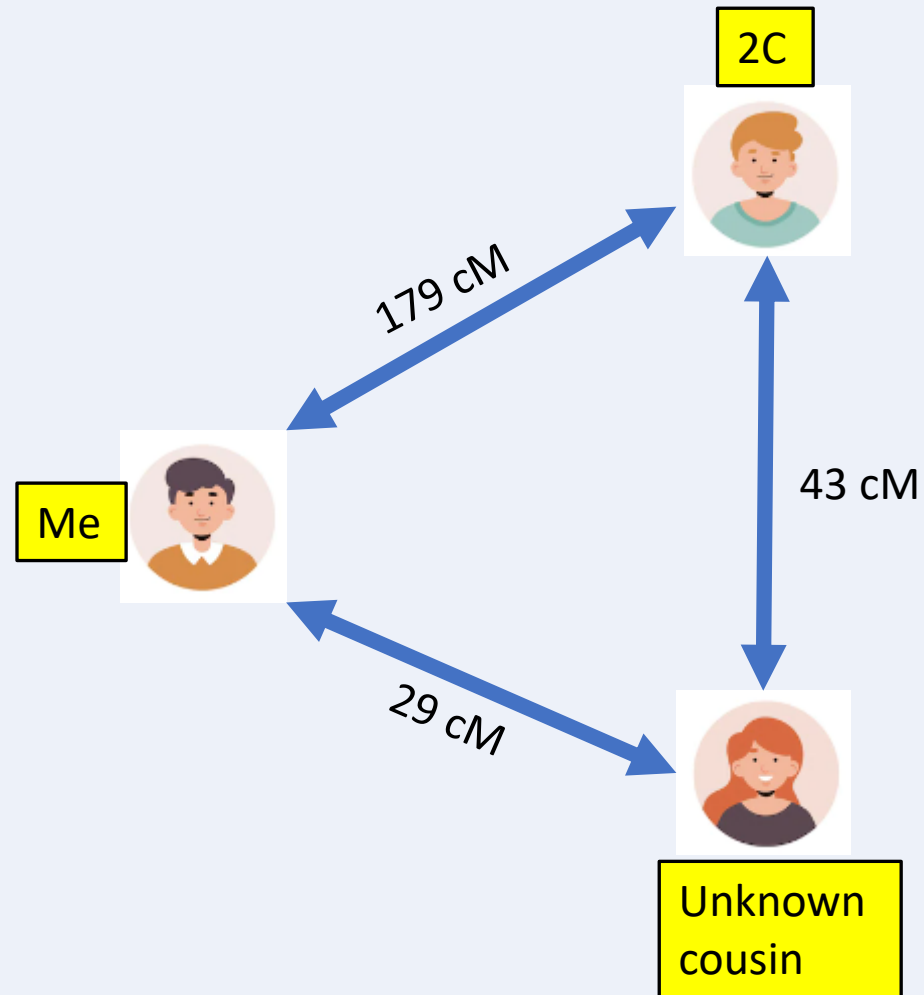
# Chromosome Map

- NOTICE: the unknown cousin segments (light blue) do **\*NOT\*** line up with any segments from my 2C
- What does this mean?



# Chromosome Map

- The three match each other but the segments between me and the unknown person do not share any of the same segments I share with the 2C
- My belief is that means the connection from me to this unknown person is actually at least one generation above the common ancestors I share with the 2C
- Would need to examine more segments to know for sure



# Chromosome Map

- Some final comments:
  - Build a strategy keeping in mind what you are trying to accomplish
  - If you want to build multiple chromosome maps then you may need to pay for a subscription





# Ancestral Trees

# Ancestral Trees

- Easiest way to get started is to upload a GEDCOM file
  - You can get a GEDCOM file from your desktop family tree program or download from an existing family tree online such as from Ancestry.com

## ANCESTRAL TREES

You can build or import a simple ancestral tree in DNA Painter showing your direct line. This can be a great way to visualize inheritance paths and see at a glance how complete your tree is.

Name      ◆ People      ◆ Created      ◆ Updated ▼

*Click the 'X' on the right to delete a tree*

Create a new tree

More about Trees



UNTITLED TREE  
Unspecified Gender

Parents  
0 of 2

Grandparents  
0 of 4

5 GENERATIONS ▼

+

Grandfather

LOAD GEDCOM X

Upload your family tree here.

Drop a GEDCOM file here or click to browse for one

If you have any issues importing your family tree, I would be very grateful if you could email a copy to [info@dhapainter.com](mailto:info@dhapainter.com) for testing. Many thanks!

# Ancestral Trees

- Select a few settings here
- For a free account you can import up to 4<sup>th</sup> Great-grandparent level
- NOTE: you can select someone else in your tree as the primary person to work a different line in your tree

LOAD GEDCOM X

If you have any issues importing your family tree, I would be very grateful if you could email a copy to [info@dnapainter.com](mailto:info@dnapainter.com) for testing. Many thanks!

**Whose direct line would you like to import?**

Type a name here and click on a result to select the person whose ancestors you'd like to import

Ken Waters (1956-)

IMPORT SETTINGS

**Privacy**

Replace the names of living people with "Living"

Import the names and details of living people as is.

**Generations**

Import up to 4th Great-Grandparent level

[Subscribe for access](#) Import all available generations

**Notes**

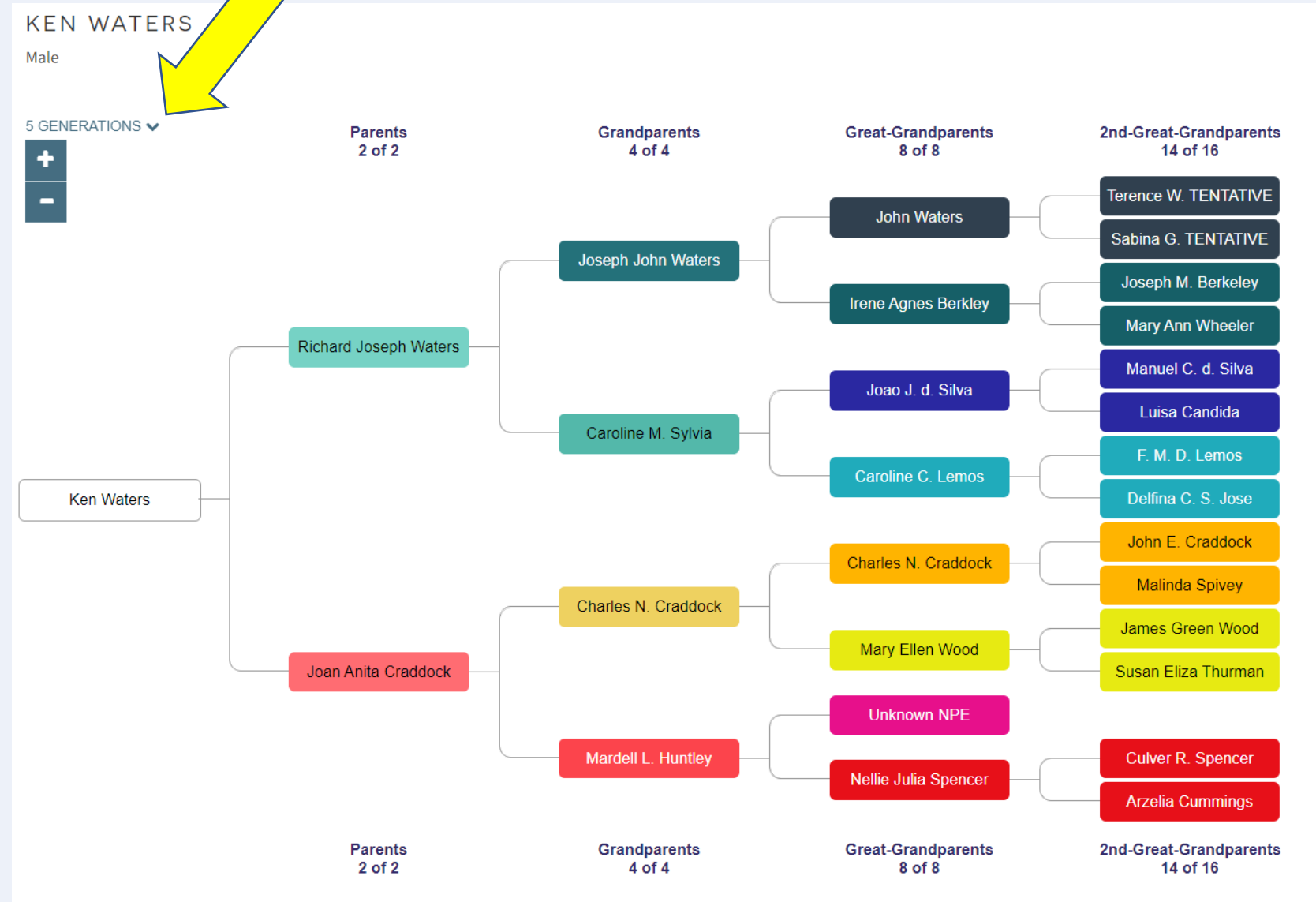
Do not import notes

Import notes

[BACK](#) [IMPORT ANCESTORS](#)

# Ancestral Trees

- This is my primary Ancestry tree used to link to my DNA kits for family
- Default is for 5 generations
- You can go up to 7 generations back to 4<sup>th</sup> great grandparents by selecting the dropdown arrow



# Ancestral Trees

- My 7-generation chart
  - As you would expect it doesn't render well to display the entire tree on the screen all at once



# Ancestral Trees

- Dimensions [NEW]
- Only one allowed for a free account
- Here I selected birth locations

## DIMENSIONS X

A dimension is a custom way of categorising your ancestors so that you can create and share different views of your direct line.

Popular examples include country or town of birth, religion and eye colour, but you are not restricted to these. For more info please see [this recent blog post](#).

**i** Your new dimension has been added. [View dimension in tree](#)  
If necessary you can click on the dimension name below to edit it or generate new colours.  
**Important notes for *Country of Birth*:**

- The site has attempted to extract the countries but may not always get this right
- The country or jurisdiction name may also have changed since this person's birth
- If necessary, hover and click 'edit' to adjust values individually for each person
- Click on a country name in the key to see a list of people assigned to that country

### AUTOMATED DIMENSIONS

**There is a limit of one dimension for free accounts.** Please consider [subscribing](#) if you would like to explore additional dimensions. You can delete existing dimensions below under *Add/edit dimensions*.

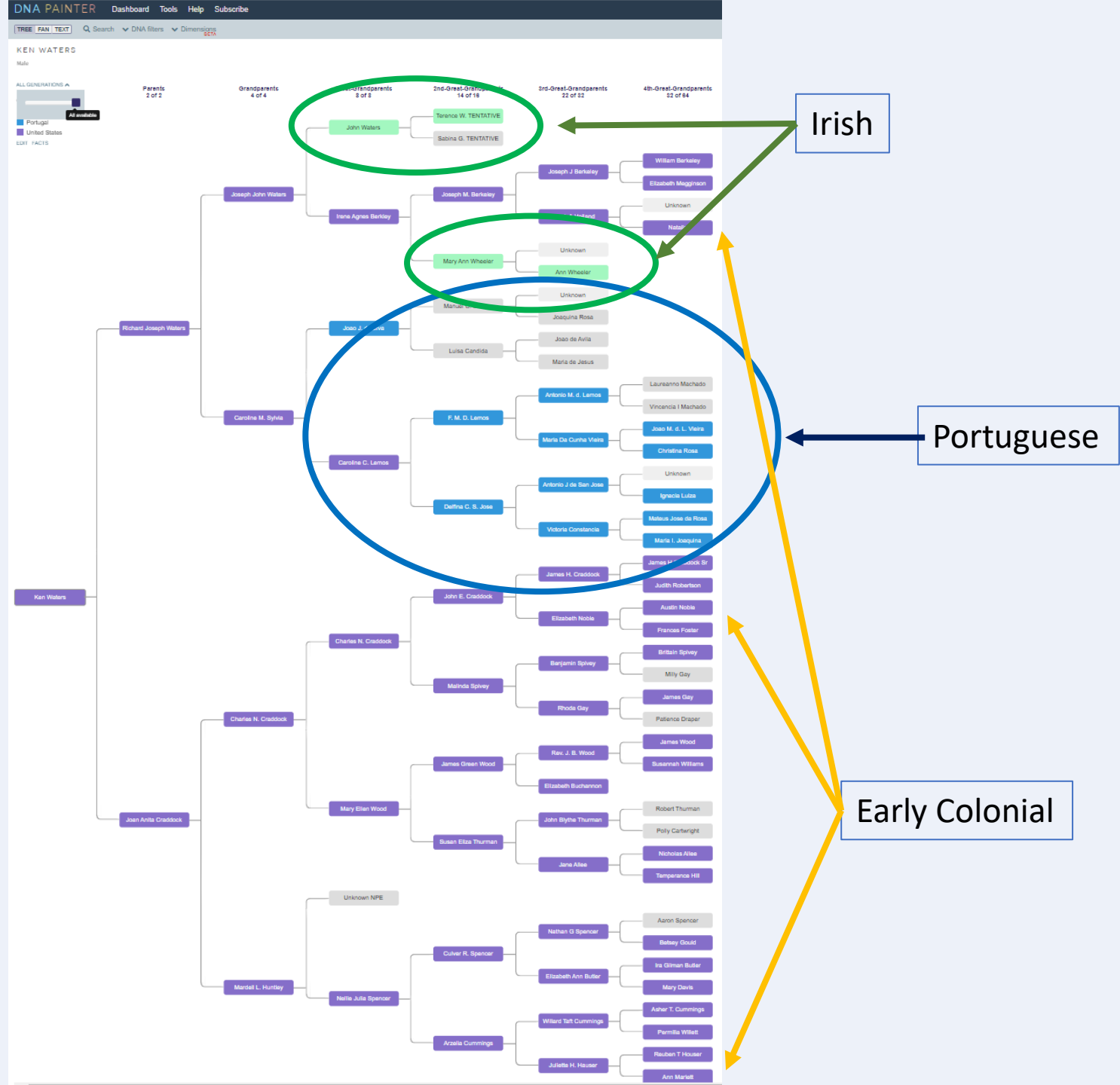
AGE AT DEATH Extracts the person's age at death from 'Birth Date' and 'Death Date'	<a href="#">SUBSCRIBE</a>
BIRTH CENTURY Extracts the century each person was born in from 'Birth Date'	<a href="#">SUBSCRIBE</a>
RESEARCH LEVEL Adds six levels of ancestral profiles for Yvette Hoitink's level-up challenge (See <a href="#">blog post</a> )	<a href="#">SUBSCRIBE</a>
WESTERN ZODIAC SIGN Calculates zodiac sign for all ancestors with a date of birth	<a href="#">SUBSCRIBE</a>
CHINESE ZODIAC SIGN Calculates 'year of the..' information for your ancestors	<a href="#">SUBSCRIBE</a>

### ADD/EDIT DIMENSIONS

[> Country of birth](#)

# Ancestral Trees

- Dimensions
  - Nice quick way to highlight birth origin countries
  - In my case:
    - Green is Ireland
    - Blue is Portugal/Azores
    - and purple shows USA [mostly my colonial roots]



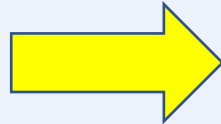
Cluster Auto-Painter



# Cluster Auto Painter

- Start with an auto-cluster file
  - I'm using my mom's kit on My Heritage

Special note: you may have to upgrade your kit on My Heritage to be able to generate an autocluster file



**MyHeritage** Home Family tree Discoveries Photos **NEW** DNA Research

## AutoClusters

An automatic tool that organizes your DNA Matches into clusters that likely descended from common ancestors

AutoClustering organizes your MyHeritage DNA Matches into shared match clusters that likely descended from common ancestors. Each of the colored cells represents an intersection between two of your matches, meaning that both individuals match you and each other. These cells are grouped together physically and by color to create a powerful visual chart of your shared match clusters. Each color represents one shared match cluster. Members of a cluster match you and most or all of the other cluster members.

Generate clusters for:  
**Joan Waters (born Craddock)** ▾

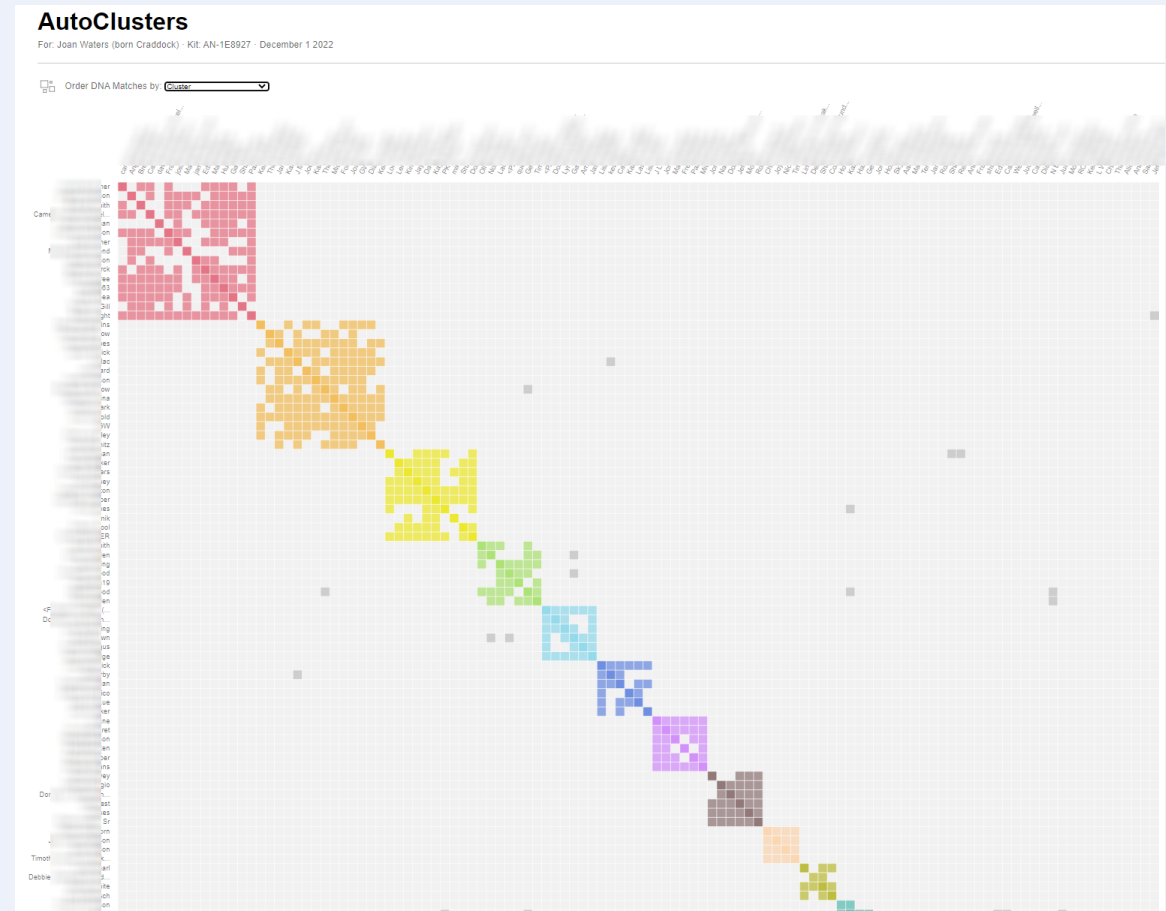
**Generate**

The AutoClustering feature on MyHeritage was developed in collaboration with Evert-Jan Blom.

### Example of AutoClusters

# Cluster Auto Painter

- Resulting autocluster display from my mom's kit at MyHeritage looks like this
- You will use the HTML file that was sent from MyHeritage as one of two input files



# Cluster Auto Painter

- Result will be an HTML file for your auto-cluster analysis
- You also need a shared segment file from MyHeritage

## CLUSTER AUTO PAINTER

Generate a chromosome map from your clusters of DNA matches so you can:

- Make notes and identify clusters as maternal or paternal
- Look at the segments behind the clusters and identify potential 'pileups'
  - + How it works

[Read more in the DNA Painter Blog](#) [CAP FAQ](#)

Please note: if you are not a current subscriber, you will need either to delete existing chromosome maps on your account or [subscribe to DNA Painter](#) in order to use this tool.

### Step 1. Check you have all the files you need

Click on the name of the site you're using to generate clusters:

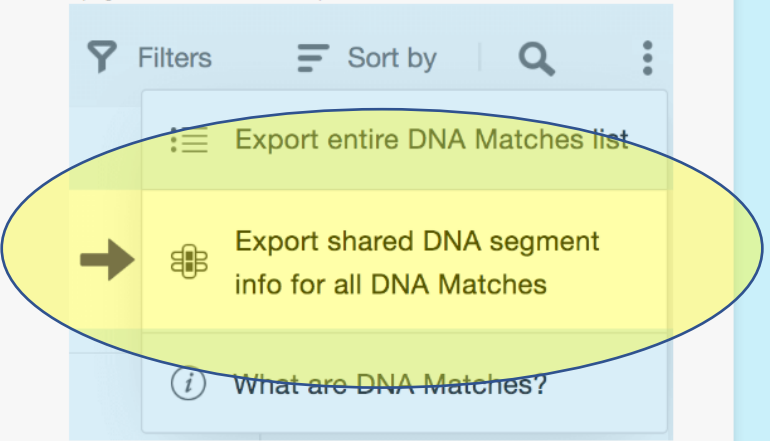
[Genetic Affairs](#) [MyHeritage](#) [Gedmatch Classic](#) [Gedmatch New](#) [DNAGedcom](#)

#### Generating the clusters

You can generate cluster files at MyHeritage via their [autocluster](#) feature. If you transferred your DNA to MyHeritage after December 2018, you may have to pay one-off unlock fee in order to run autoclusters.

#### Files needed

- **Autocluster HTML file:** A zip file will be emailed to you. After you unzip this file, you'll see an HTML file (named `[fester] Autoclusters - [date].html`)
- **Segments CSV file:** You also need to download a separate CSV file of "segments" from MyHeritage. This needs to be downloaded from the following place:
  - Go to the MyHeritage [DNA Matches](#) and click on the 'three vertical dots' icon at the top right of the list of matches to expand the menu.



The screenshot shows a mobile interface for DNA matches. At the top, there are icons for 'Filters', 'Sort by', a search icon, and a three-dot menu icon. Below this, a dropdown menu is open, listing three options: 'Export entire DNA Matches list', 'Export shared DNA segment info for all DNA Matches', and 'What are DNA Matches?'. The 'Export shared DNA segment info for all DNA Matches' option is highlighted with a yellow background and a blue arrow pointing to it from the left.

- Click on 'Export shared DNA segment info for all DNA Matches' and the file will be emailed to you (this can take an hour or more).
- Please unzip the file.

- **Note:** On a PC, the contents of a zip file need to be extracted to a folder before they can be used.

# Cluster Auto Painter

- Final result (note: only 1 chromosome diagram allowed for free acct)
- This basically merges clusters and segments that could be useful for segment analysis – determining what part of each chromosome came from which cluster (or, genetic network)




# Wrap-Up

- DNAPainter is a wonderful collection of useful tools for genetic genealogists
- Some of the tools are easy to understand but others require more study to comprehend and fully use
- Take advantage of Jonny Perl's videos to gain understanding

**SHARED CM TOOL** UPDATED

An interactive tool to show possible and probable relationships based on centimorgans shared

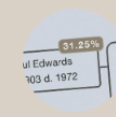
- Go to the tool
- New version where you can enter two values
- Beta version with updated probabilities



**COVERAGE ESTIMATOR** NEW

Estimate DNA coverage for an ancestor by indicating which of their descendants has tested. Save and share coverage trees.


- Read blog post
- Try the coverage estimator tool



**DISTINCT SEGMENT GENERATOR**


Copy and paste two or more sets of segments that multiple family members share with a single match. This tool will identify the distinct segments and return cM values for each along with the total cM.

- Read blog post
- Go to the tool



**WHAT ARE THE ODDS V1**


- Create a new probability tree
- Frequently asked questions
- Early prototype table version



**LIBRARY OF MATCHES**

A collection by Cody Ely of real example matches and shared segments from a wide variety of relationships, to be used for relationship prediction and reference.


- Read blog post
- Visit the map



**COMMON SEGMENT GENERATOR**

Copy and paste in two sets of segments. The tool will return just those that are common to all sets.


- Read blog post
- Go to the tool



**WHAT ARE THE ODDS? BETA V2**

A tool to use the shared cM from multiple matches to test out hypotheses

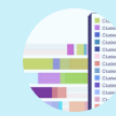
- Create a new probability tree
- Frequently asked questions



**CLUSTER AUTO PAINTER**

Takes your cluster file and segments files and generates a chromosome map with the segments grouped by cluster.


- Read blog post
- Go to the tool



**CM ESTIMATOR**

Enter the chromosome, start, and end positions and this tool will calculate an estimated number of centiMorgans (cM) to one decimal place.


- Read blog post
- Go to the tool



**ANCESTRY CHROMOSOME PAINTER SEGMENTS** NEW

Convert your AncestryDNA 'Chromosome Painter' segments into chromosome, start and stop points that you can use in your chromosome map


- Read blog post
- Visit the tool



**INFERRED SEGMENT GENERATOR**

Copy and paste the segments that you and a close relative share with a DNA match, and this tool will output just the segments that you do not share with the match.

- Read blog post
- Go to the tool



**INDIVIDUAL MATCH FILTER**

Paste in segments, and the tool will return the segments and total filtered cM according to the criteria you set


- Go to the tool



**BUCKETING**

A tool that can help group matches into maternal and paternal (or link them to a common ancestor) by filtering a list of segments using other lists of segments or matches from known relatives

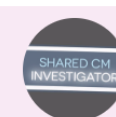
- Read blog post
- Try the bucketing tool



**SHARED CM INVESTIGATOR**

Paste multiple sets of segments that siblings share with a match and this tool will estimate the total amount of DNA the parent is likely to have shared with this match.


- Read blog post
- Go to the tool



**CLUSTER FORMATTER**

A simple tool to extract a CSV of clusters and matches from your Genetic Affairs or MyHeritage autocluster output.

- Go to the tool



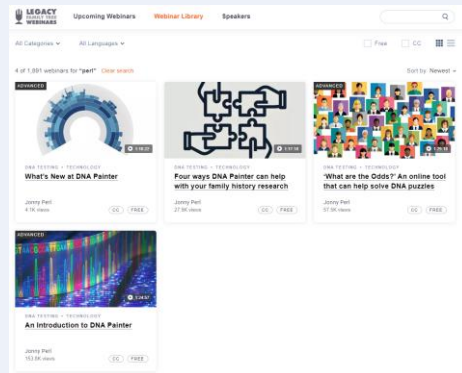
# Facebook Group

- If you're on Facebook be sure to join this group so you can post questions and read what others are posting

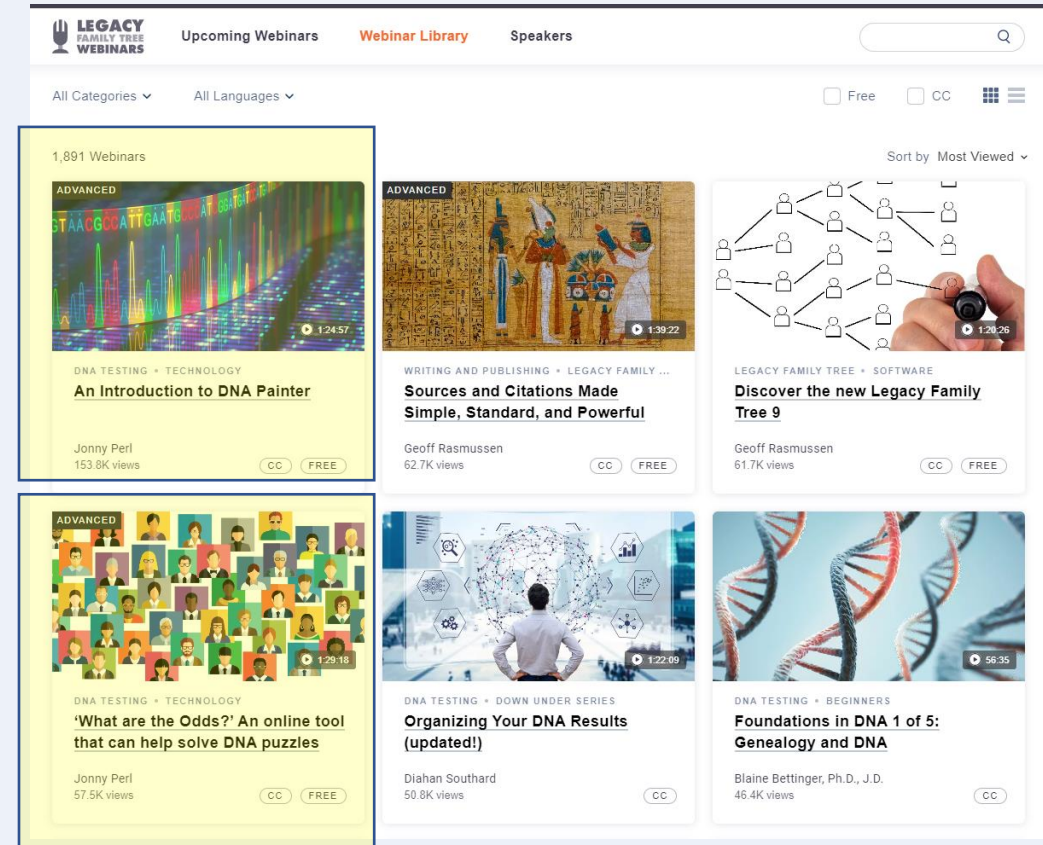
The screenshot shows the Facebook interface for the "DNA Painter User Group". At the top, the group name "DNA Painter User Group" is displayed in white, with a lock icon and the text "Private group · 14.3K members" below it. A horizontal menu contains tabs for "Discussion", "Featured", "Members", "Media", "Files", "Questions", and "Reels". Below the menu is a text input field with a profile picture and the placeholder "Write something...". Underneath are three icons for "Reel", "Photo/video", and "Poll". The "Featured" section shows "3 new" items. The first featured post is by "Jonny Perl" from March 10, 2018, with the text "Welcome to all new group members! Pl...". The second featured post is a link shared by "Jonny Perl" on March 3, with the text "The DNA Painter Expo Hall booth is now open at RootsTech 2022...". Below the link is a graphic for "DNA PAINTER" with the website "FAMILYSEARCH.ORG" and the text "Virtual Booth • DNA Painter • RootsTech 2022". At the bottom, a dropdown menu is set to "Most Relevant".

# Legacy Family Tree Webinars

- Also, be sure to catch Jonny's excellent webinars on Legacy Family Tree Webinars



- As of 12/5/2022 he owns the #1 and #4 most watched webinars in their database!



## Quote of the Day

*“DNA doesn't lie. But it sure can be misinterpreted.”*

– Ken Waters



# Upcoming Classes/Presentations

## **Sat, Dec 10, 1 pm – 2 pm**

Title: A Unified Process for Working with Ancestry DNA Matches

Description: We will discuss a useful methodology for working your DNA matches starting with the basics and then digging deeper into ways to improve your Ancestry DNA efforts. This will include using Tag Groups, shared matches, and identifying those matches in order to add to your family tree.

## **Sat, Jan 14, 2 pm**

Topic: Identifying Your DNA Matches

Description: One of the primary steps in working with your DNA match list is identifying the matches so that you can work them into your family tree. Sometimes it's easy or you can communicate with the match. But, more often, that is not the case and so a series of steps may be required in order to identify them

## **Wed, Feb 1, 7 pm (Private Group—contact Ken for information)**

Topic: Working with DNA Matches

All library classes (highlighted blue) are free to attend and require no registration. Classes are held at the Red Mountain Mesa Public Library at 635 N Power Rd in Mesa (unless otherwise noted above).



**FamilyTreeAZ.com**



Presentations:

<http://familytreeaz.com/Presentations>



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