Shared DNA at a glance: the new DNA matrix tool

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DNA Painter is a popular website for genealogists working with DNA. You can find it at dnapainter.com.

Some popular uses include:

- **Investigating family mysteries** using *What are the Odds?*
- **Visualizing your direct line** in an ancestral tree
- **Mapping segments of DNA to ancestors** in a chromosome map
- **Figuring out how you might be related to a DNA match** using the Shared cM tool

The site **does not** use your raw DNA data file. Instead, it lets you visualize and perform calculations using:

- **Segment coordinates**
  - e.g. for chromosome mapping
- **Shared centimorgan (cM) amounts**
  - e.g. for relationship prediction tools such as (WATO) and the shared cM tool)
- **GEDCOM files** (a textual format for family trees)
  - e.g. visualizing your direct line in an ancestral tree, or importing into WATO

This webinar is about a new feature: the matrix tool, which uses amounts of shared cM for a group of DNA testers.

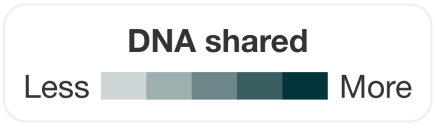
What is it?

A matrix of DNA testers is a grid where tester names are arranged along both the top row and the leftmost column.

Each cell then contains the amount of DNA that the corresponding pair of testers share. When you click on a name or an amount, additional information appears in an overlay.

In this example, the testers are Bart, Lisa, and Maggie. Since names can get quite long, they are abbreviated in the vertical table headers.

	B	L	M
Bart	--	2445	2890
Lisa	2445	--	2667
Maggie	2890	2667	--



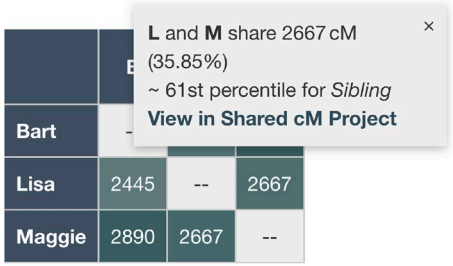
	B	L	M
Bart	--	2445	2890
Lisa	2445	--	2667
Maggie	2890	2667	--

The default shading is based on how much DNA is shared.

If you've entered how the testers are related to each other, you can shade the boxes by the percentile value: how much is shared vs the expected amount for that relationship:

- Bart and Maggie share 2,890cM, which is much more than most siblings, so the cell with the amount they share is shaded green based on them being in the 94th percentile of shared amounts.
- Lisa and Bart share 2,445cM, which is much less than most siblings, so their cell is shaded purple based on them being in the 17th percentile of shared amounts.

If you click on a cell, the summary includes a link to view the relevant histogram within the Shared cM Project.



What is the tool for?

I built the tool because I had a vast number of testers in my family and some of them wanted to know:

- How much they shared with each other tested person
- Which person they were 'more like' genetically
    - This can be estimated by comparing the amounts of DNA shared between two people to typical ranges for their known relationship

To summarize, the matrix tool is a simple but compact and pleasing way to showcase how much DNA a group of people share with each other.

Features shown in the demo

- Where to finding the tool in your dashboard at DNA Painter
- Naming the matrix and adding testers manually
- Adding shared cM amounts and relationships
- Different views: % or cM shared
- Different shading: by amount shared or amount vs expected amount for that relationship
- Edit mode
- Loading data in
- Exporting files and images
- Sharing
- Clearing data

Discussion

Potential uses

Since the tool is brand new, it's not completely clear to me how it will be used.

Aside from presenting shared amounts from a known group, the first use case that springs to mind is **cluster analysis**:

- Take a match and find other matches who share DNA with them:
    - Manually via *Shared Matches* at AncestryDNA or

MyHeritage, or *In Common With* at FamilyTreeDNA or *People who match both kits, or 1 of 2 kits* at Gedmatch
    - Or automatically via Genetic Affairs/DNA Gedcom
- Collate the amount of DNA that each person in the cluster shares with each other:
    - Manually by typing in the amounts
    - Or automatically by using the Matrix function at FamilyTreeDNA or Gedmatch, copying the table and pasting it into the **Load** field in the DNA Painter tool

Comparison with matrix related genealogy tools

Auto-clustering via the Genetic Affairs/DNA Gedcom/Gedmatch/MyHeritage

- Similar grid design with testers
- Testers are clustered into related groups but the amount each person shares with each other is not included
- A future Genetic Affairs update to the Autokinship tool will combine clustering with the amounts that each tester shares with each other

BanyanDNA

This tool for relationship validation and prediction allows you to collate the same information as the Matrix tool. It will also calculate relationships from your GEDCOM. However, there's no matrix display view at the moment.

Charting companion

This PC-based genealogy software has a feature called DNA Matrix but in fact this is a Maguire chart style diagram as opposed to a matrix of shared amounts.

Planned future enhancements

Top of my list for future improvements is the option to select testers from a GEDCOM and then calculate the relationships between testers automatically. I also plan to add user-configurable options:

- Show the abbreviated name in parentheses after the name in the left column for clarity
- Allow colours used in cell shading to be customized