[title slide]

Introduce myself

[Chr 16 slide]

The same question seems to come up over and over again among those new to autosomal DNA testing. If I match A and B on the same segment why is that not enough to prove we all have a common ancestor?

The reason the ancestor is not proven is that you have two strands of DNA on each chromosome (remember there are 23 pairs of chromosomes) and the testing mechanism cannot differentiate between the two of them.

[IBC slide]

So A could match the piece from your mother and B could match the piece from your father or one of them could even be a false match to a mix from both parents.

[slide ISOGG wiki]

In genealogical research we talk about the genealogical proof standard; in DNA explorations we talk about triangulation.

Triangulation of autosomal DNA tests results is when three people all match each other at the same DNA location.

To quote the ISOGG wiki (which I recommend you look at for understanding DNA terminology)

"If you have at least three people with a common ancestor matching on the same segment then you can infer that the segment came from that ancestor. "

Or to rephrase, if three people all match each other on the same segment then you can infer they have a common ancestor.

[slide shared DNA numbers close family from Blaine Bettinger]

You don't need to use triangulation for close family: 2nd cousins and closer will be clearly indicated by the amount of shared DNA (use the total cM in segments greater than 7 not including the X).

See the statistics listing at the ISOGG wiki to make these determinations: http://www.isogg.org/wiki/Autosomal_DNA_statistics

or this beautiful chart shown on this slide recently produced by Blaine Bettinger on his blog, the genetic genealogist - http://www.thegeneticgenealogist.com/

Please take note of the statistics for 3rd cousins once removed 0-332 and an average of 76 cM

We use triangulation to confirm where DNA relatives more distant than 3rd cousins fit in and occasionally for those thirds as well. *When a new DNA cousin matches a known relative as well as you on the same segment, then you have found the family line they are related on.*

Let's do a few case studies to see how this works.

[slide wold family tree in pictures]

You can also use triangulation to confirm a suspected family relationship.

I got an email a while backfrom Dennis, a genealogist who told me that he thought his wife's gg-grandfather was the same person as Carl (Charlie) Wold, the brother of my g-grandmother Maren Wold, via Carl's first wife, who died in child birth, and that child was left with his grandparents while Carl moved on. This would make her possibly my third cousin once removed.

Charlie had 3 or 4 more wives and moved a few times. He was quite colorful fellow. Naturally I suggested a DNA test. Since there were no male descendants to test, Kristine did an autosomal DNA test

I also asked a known Wold 3rd cousin once removed descended from a different WOLD brother to test. This gave her a number of possible relatives to compare to: me, my brother, my dad, my first cousins George and Henry, my 2nd cousin John, and this 3rd cousin Mike for me to compare her to. Since then another 3rd cousin on this line has been found via DNA testing, Katy.

Here is a visual representation of how all the WOLD cousins are related. Notice that Katy and Mike are descended from brother Anton whereas my close family are all descended from Maren.

[slide chromosome comparison Kristine]

When the results came in, she was NOT a match to my Dad, my brother, and I. She did match all the other cousins and there were several places where she matched more than one, so did her DNA results triangulate? Is she a Wold? These are almost all her possible 3rd cousins once removed

Now is the time to remember the statistics for 3rd cousins once removed 0-332 and an average of 76 cM

What is missing?

[slide Mike versus John in DNA with Katy's DNA segments]

Right we need to compare each of these matches to each other: John and Mike, Mike and Katy and John with George.

These Norwegians married other Norwegians in their first generation in the USA so Kristine could possibly be related to my cousins on a different line.

Looking at Mike versus John should be a good indicator as they only share the common ancestors that we think Kristine shares. John has almost the same relationship to Mike as he does to Kristine

[slide John v George]

George and Henry are brothers so I am assuming they match since their other side is a different group.

John is their 2nd cousin so lots of large matching segments

[slide Mike versus Katy in DNA with Katy's DNA segments]

Notice how much DNA, Mike and Katy share. That is because they are more closely related to each other than the rest of us, they are 2nd cousins once removed.

[repeat of Wold family slide]

Have we proven this match?

Moral of the story: Get lots of family members to test as the lack of a match does not disprove a relationship at the third cousin level or further out.

[slide LuAnn match]

The way I use triangulation most often is to fit a new DNA relative onto the correct family line so that I can try to find our common ancestor. My Dad is 100% Norwegian in ancestry, descended from three different Norwegian families. His Dad was born in Norway and his mother in Brooklyn to two Norwegian immigrants who met in NYC. Remember what I said about Norwegians marrying each other in the first generation or two

LuAnn recently accepted my 23andme share request. She only matches for one segment but it is a good sized one since she shares .16% with Dad. This may be findable or not. One segment matches can end up being pretty far back in time. I have a few that are from the 1500 and 1600s.

[slide 23andme comparison]

The first thing I do with a new sharing match on 23andme is go to Ancestry Tools, Family Inheritance: Advanced (aka FIA) and compare them to my Dad, my brother, myself, and my two 2nd cousins. The second cousins, when they match, isolate the line for me to Dad's paternal or maternal.

I immediately switch from the picture view (called plot view) to the table view and then cut and paste those numbers to my master spreadsheet for my Dad.

[slide spreadsheet]

In order to use triangulation to figure out where a new DNA relative fits in, you need to keep spreadsheets or use the tool genomemate to organize your match data.

Personally I keep a spreadsheets for each person in my family who is tested plus another spreadsheet for the contact list and notes

So this new match for Dad, LuAnn, is only one segment but a decent size at 12.2 cM.

[closeup of LuAnn spreadsheet]

When I added her to Dad's spreadsheet, I saw she had lots of company. Notice how I reformat the numbers with commas so they are easier to see and put a light background color the triangulated groups, aka TGs

She is at locaton 46M to 58M and is bracketed by Lester and Jeff on the sheet

[slide LuAnn matches]

So next I compared LuAnn to Lester and Jeff as well as to Dad, my brother, and me

So she matched Lester and my brother, but not me or Jeff

I removed the MRCA column so you can see my notes. Everyone in yellow matches each other and my brother. This is a helpfule traingulation that my brother matches all these folk and I do not. I only match Jeff. This tells me that my brother and I got DNA from different sides at that location

So which side is my brother and LuAnn?

[slide Luann xcell assigned]

As you can see from the orange at the top, WOLD side cousin Katy's match extends the length of this

sheet, that's why I made her orange. Else I might miss that she matches people further down on the sheet. I did not make Henry orange since he is Dad's nephew, there is no new information provided by whether or not he matches except that it is a real match. His matching DNA with Dad is from the same sources, Dad's parents via Dad's sister

Katy is tested over at family tree DNA however, so I cannot compare her to LuAnn BUT because my brother's test is also on family tree DNA, the fact that my brother matches that entire segment from Katy tells me that anyone who matches my brother and my Dad here, will be a match to Katy. This is another way to use triangulation!

So now LuAnn and I need to look through her family tree and find where she connects with the WOLDs

 [slide ftDNA matches]

At 23andme and GEDmatch you can directly compare people to see if they match. Although you need to be sharing with them at 23adme. Family Tree DNA does not let you compare directly but there are ways around that

[slide Gunnar in chromosome browser family tree DNA]

Dad had a new 3rd-5th cousin match at family tree DNA, Gunnar. When I looked at him in the chromosome browser I saw that same segment as LuAnn on chromosome 2. I clicked the link "View this data in a table" to get the numbers and added him to my sheet.

Now how can I tell if he is a match to Katy and all the other WOLD line folk at this segment? Any ideas? As I do not own his kit, I cannot compare it to Katy. I could write to Katy and ask her to see if he is a match. Since we are in touch, that would work.

But there is a simpler way

[slide Gunnar with Shipley]

My brother's test is also over at family tree DNA and he matches Katy on this segment. So I can check if he matches Gunnar at this spot. Here is his chromosome browser result with Gunnar.

Notice that my brother's match is actually larger than my Dad's. Why might that be? Well Gunnar probably matches my mother for a tiny bit at the beginning of this segment.

Anyone see the flaw with this? Right, if Gunnar matches less than 20cM with my brother he will not appear in his match list at family tree DNA.

[slide ICW select]

Those folk who do not have lots of relatives tested, have to rely on the "In Common With" function to see if two folk are likely to match. This is only effective in non-endogamous populations … I am told it is around 90% accurate

On your family Finder Match page, click under the match and a menu bar will appear. Click on the words "Common Matches" and then select "In Common With"

[Slide ICW]

Now you will see all the matches that in common with the person selected, sorted according to their match with the primary person, here my Dad

You notice Gunnar is ICW with me as well, even though I do not have the nice big segment on

chromosome 2

[slide Kitty to Gunnar]

So no surprise, Gunnar and I do not match on chromosome 2 but we do match on that segment on chromosome 20 that he has in common with Dad. A triangulation to explore another day

[slide Matrix]

Another way to view in common with matches and quickly see if a group are in common with each other is to use the Matrix. You can find this function on your Family Finder menu

[Gedmatch tier1]

Perhaps you would like this triangulation business automated? Well the GEDmatch site has a tool for that if you are a tier 1 member

[Gedmatch form]

You can select how you want to see the output, either sorted by chromsome location without the full information or sorted by name with the full information. Here are samples of each

[location]

this one is easier to visualize

[name]

but this one has all the information and you can always cut and paste it to a spreadsheet and sort it there

[spreadsheet]

I have lots of blog posts on making these spreadsheets

[slide maria Xcell]

In an ideal world, you get a new match, put her numbers into your master spreadsheet and see that she fits into a triangulated group (TG) that is already assigned to a specific ancestral line. You compare her and she matches all the others. You contact her, letting her know that it looks like she is related to you and your Holland cousins and she says "Oh yeah my g-grandfather was Christian Holland" and you do a happy dance and get more information and add her to your tree ... this does not happen often enough but the more data you collect and the more known cousins you test, the higher your channces are

This is a new technology and the tools to do the work for you are not well developed yet. We all have much to learn

DNA triangulation can be used to confirm a relationship or to place a new DNA relative in a triangulated group and then perhaps find the common ancestor. Data from other tested close family members can help with triangulations.