DNA in Practice

Class 1: How to Plan a DNA Research Project

Pam Holland, Researcher

THE BRUE FAMILY LEARNING CENTER

American Ancestors
by New England Historic Genealogical Society

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Meet today's presenter

Pam Holland

Researcher

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OVERVIEW

- **Presentation** (60 mins.)
  - Basics of DNA
  - The types of tests available
  - Setting goals
  - Choosing a test
  - Creating a plan of action
  - Tips for organizing your results
  - Tools for interpreting your results

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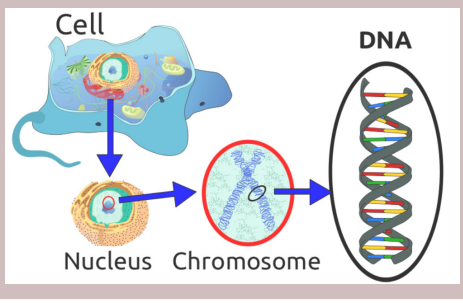

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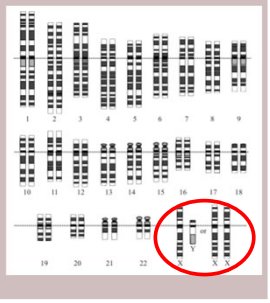
What is DNA?

- Autosomal DNA
  - 22 Chromosome Pairs
- Sex Chromosome
  - XY or XX
- Mitochondrial DNA
  - Outside the nucleus of the cell



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Autosomal DNA

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Autosomal Testing Companies

ancestryDNA
FamilyTreeDNA
23andMe
MyHeritageDNA
Living DNA YOUR ANCESTRY

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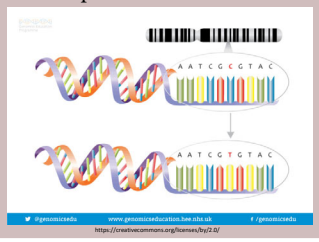
Autosomal DNA Test

- Looks at SNP's (pieces) of all the 22 Autosomal Chromosomes plus the X Chromosome



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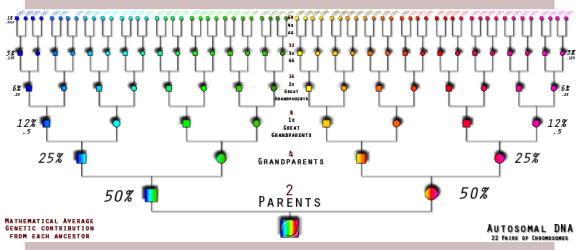
Autosomal Inheritance



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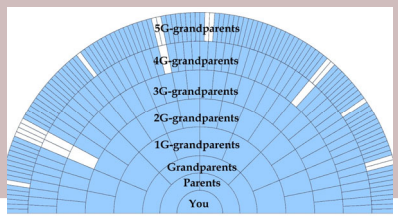
Genealogical vs. Genetic Tree

- Genealogical Tree includes all your ancestors
- Genetic Tree only includes the ancestors you inherited DNA from



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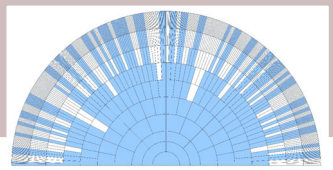
Genealogical vs. Genetic Tree

- 100% probability of inheriting DNA from great-grandparent or 2G-grandparent
- 95% for 5G-grandparent
- <50% for 8G-grandparent
- 15% for 10G-grandparent



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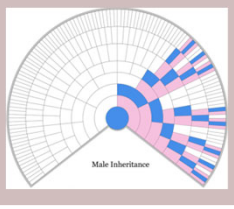
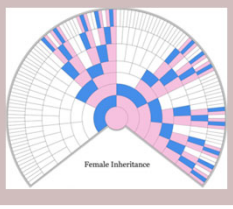
X-DNA

- Inherited differently by males & females
- It can help you focus on certain lines





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Autosomal DNA is Best for:

- Either men or women as both can test
- Finding or comparing close cousins
- Discovering mutual ancestors with your matches within the last 5 or 6 generations
- Confirming your paper trail research
- Determining which chromosomes are from your mother or father, if parent(s) have tested

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Autosomal Testing Caveat

- Non-paternity events
- Unexpected or disturbing results
- Contradictory information

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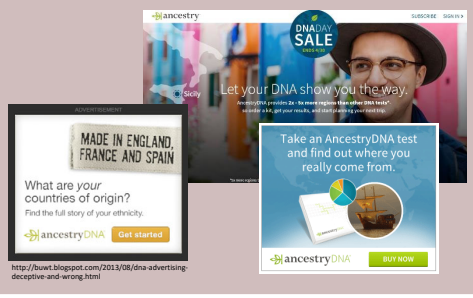
Ethnicity Estimates



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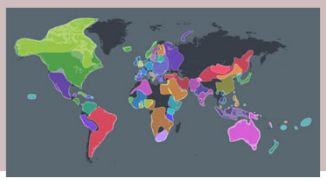
Reference Panels

- DNA samples from populations in a specific area
- People with documented ancestry from the area
- Each company has different sets of samples



AncestryDNA's overlapping regions

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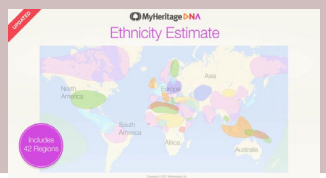
Which group are you in?

- Algorithms determine your assigned region
- May be put in a broader region
- Labels may be confusing



MyHeritage's overlapping regions

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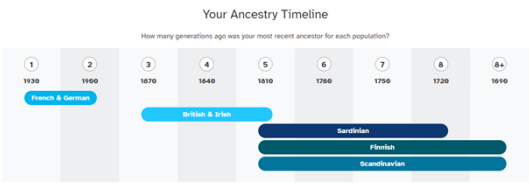
Ethnicity timeframes

- Usually about 500-1000 years ago
- Ancestry and 23andMe may be within 500 years



23andMe's Timeline by Generation

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Y-DNA

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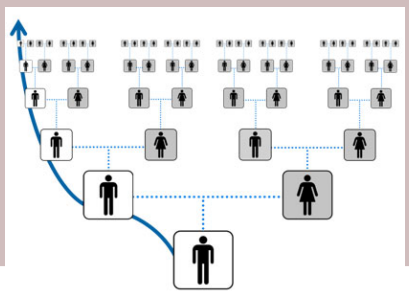
Y-DNA Test

- Y-chromosome is passed from father to son



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Y-DNA is Best for:

- Researching your paternal ancestry and paternal haplogroup
- One name study projects
- Comparing male immigrants in the new world (to the 1600s)

Grave of Benjamin Child, Jr.

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Mitochondrial DNA

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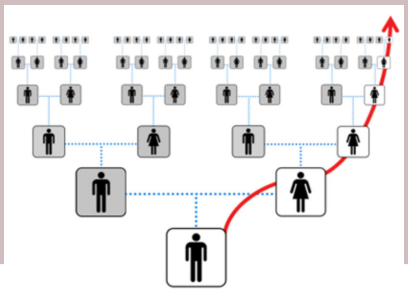
Mitochondrial DNA Test

- Mitochondrial DNA is passed from mother to child



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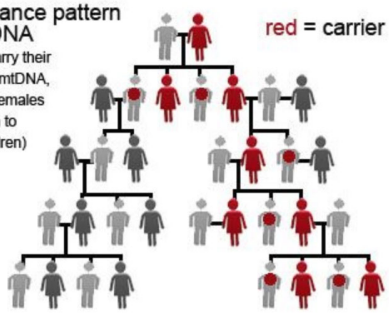
Mitochondrial DNA Inheritance

Inheritance pattern of mtDNA
(males carry their mother's mtDNA, but only females pass it on to their children)

red = carrier



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mtDNA is Best for:

- Comparing to see if two people have the same maternal ancestor
- Discovering your maternal haplogroup which may shed light on your maternal ethnicity
- Learn about your maternal haplogroup origins and migration patterns thousands of years ago

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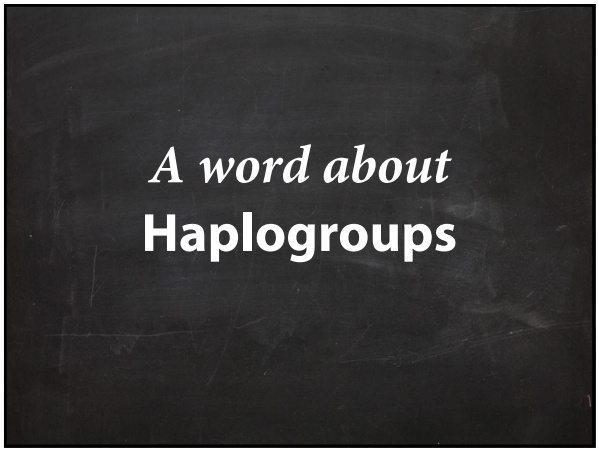

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Maternal Haplogroup

- Derived from your Mitochondrial DNA
- Available at 23andMe and FamilyTreeDNA
- 23andMe – part of autosomal testing
- FamilyTreeDNA – part of Mitochondrial testing

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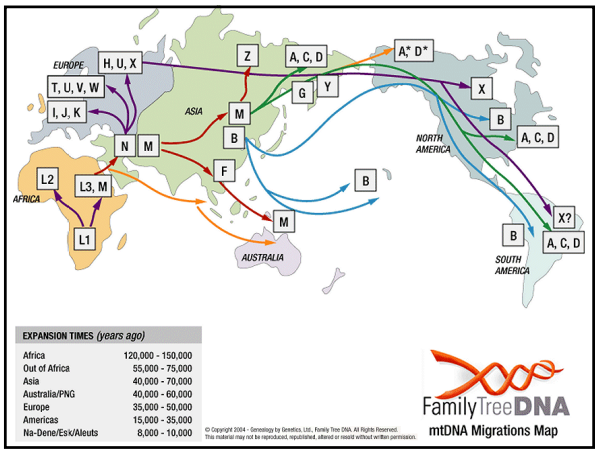

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Paternal Haplogroup

- Derived from Y-DNA
- Available for men at 23andMe and FamilyTreeDNA
- 23andMe – part of autosomal testing
- FamilyTreeDNA – part of Y-DNA testing

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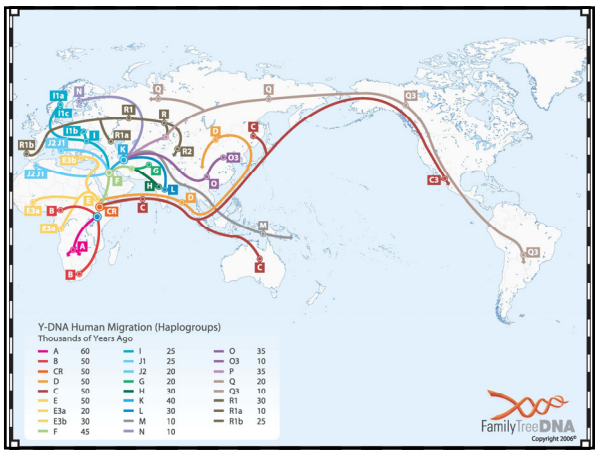

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Using DNA in Family History

What DNA can do:

- Find relatives and cousins who have tested
- Test a hypothesis
- Confirm a matrilineal or patrilineal origin
- Provide evidence of recent non-paternity events
- Deliver unexpected results

What DNA cannot do:

- Solve a brick wall ancestor without any genealogical research
- Determine a Native American tribe
- Be positive proof of a suspected distant ancestor

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Goal	DNA Test(s)
Learn ethnic origins	Autosomal
Connect with genetic cousins	Autosomal
Connect with biological family	Autosomal
Identify father of a recent male ancestor (within 5 generations)	Autosomal and Y-DNA
Identify father of an historic male ancestor (5 – 15 generations back)	Y-DNA
Identify mother of a recent female ancestor (within 5 generations)	Autosomal and mtDNA
Identify mother of historic female ancestor (5 – 15 generations back)	mtDNA
Learn health predispositions	Autosomal

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The Tests

- Y-DNA Test
  - FamilyTreeDNA
- Mitochondrial DNA
  - FamilyTreeDNA
- Autosomal Test
  - FamilyTreeDNA
  - AncestryDNA
  - 23andMe
  - MyHeritage

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Choosing an Autosomal Testing Company

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Considerations when testing

- Explore the company's databases and the tests they offer
- What is the size of their testing pool? Who are the testers?
- Are the regions you're researching represented?
- Do they have the tools you want?
- What is the cost?
- *There are pros and cons to each company!*

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Company similarities

- Shared matches based on amount of shared cM
- Surname searching
- Downloading raw DNA results
- Keep DNA samples for some period of time

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AncestryDNA

- Autosomal
- +21 million participants
- Cost: $99 (Ancestry)
- Saliva test
- Low responsiveness from matches; may not know a lot about their own family history
- Large and growing tool kit; an Ancestry subscription is needed to access all their features

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23andMe

- Autosomal including:
  - Maternal mtDNA haplogroup (for men & women)
  - Paternal Y-DNA haplogroup (for men)
- +12 million participants
- Cost: $99 (Ancestry) $199 (Health & Ancestry)
- Saliva test with options
- Low responsiveness from matches; may not know a lot about their own family history

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MyHeritage

- Autosomal
- +5.5 million participants
- Cost: $89 (Ancestry)
- Autosomal transfer is free but $29 unlocking fee to access advanced tools.
- Cheek swab
- Medium to high responsiveness from matches; may know more about their own family history
- Large and growing tool kit.

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FamilyTreeDNA

- Autosomal, Y-DNA, Mitochondrial
- +1.2 million participants
- Cost: $79 (Autosomal) $119 - $449 (Y-DNA) $159 (mtDNA)
- Autosomal transfer is free but $19 unlocking fee
- Cheek swab
- Medium to high responsiveness from matches; may know more about their own family history

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	Ancestry DNA	23and Me	My Heritage	Family Tree DNA
Autosomal participants	+21 million	+12 million	+5.5 million	+1.2 million
Autosomal test cost	$99	$99	$89	$79
Collection method	Saliva	Saliva	Cheek Swab	Cheek Swab
Medical information option	No*	+ $100	No	No
Shared matches	Yes	Yes	Yes	Yes
Search by surname	Yes	Yes	Yes	Yes
Keep private notes	Yes	Yes	Yes	Yes
DNA download	Yes	Yes	Yes	Yes
DNA upload	No	No	Yes	Yes
Keeps sample	Yes	Yes	Yes	Yes

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	Ancestry DNA	23and Me	My Heritage	Family Tree DNA
Linked tree (*link matches)	Yes*	No	Yes	Yes*
Ethnic communities	Yes	No	Yes	No
Ethnicity by chromosome	Yes	Yes	No	Yes
X-DNA viewable	No	Yes	No	Yes
Chromosome Browser	No	Yes	Yes	Yes
Name Projects	No	No	No	Yes
Y & mtDNA haplogroups	No	Yes	No	Yes*
Sells DNA for research with opt-in	Yes	Yes	Yes	Yes
Law Enforcement Cooperation	No	No	No	Yes

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Unique Tools

	Ancestry DNA	23and Me	My Heritage	Family Tree DNA
Common Ancestors	Yes			
ThruLines	Yes			
Theory of Family Relativity			Yes	
Smart Matches			Yes	
AutoClusters			Yes	
Family Tree with predicted relationships		Yes		
DNA groups or labels (self-created)	Colored Dots		Colored Dots	
Search by common location in match's tree	Birth location	Country	Country	

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Getting the most from your results

- Provide a well-researched and documented tree at the testing company. Try to go back 8 generations to your 6th great-grandparents where possible.
- Link your test to yourself at Ancestry, MyHeritage and FamilyTreeDNA
- Update your Profile with surname and location information

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Finding more matches

- Test close relatives and different branches of your family tree – the older the better
- Test at multiple companies to find the most matches

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Finding other participants

- You need to compare your results to other individuals to confirm or reject a hypothesis
- Their DNA may hold valuable clues for your existing theories
- Your DNA may be "useless" for your project or theory

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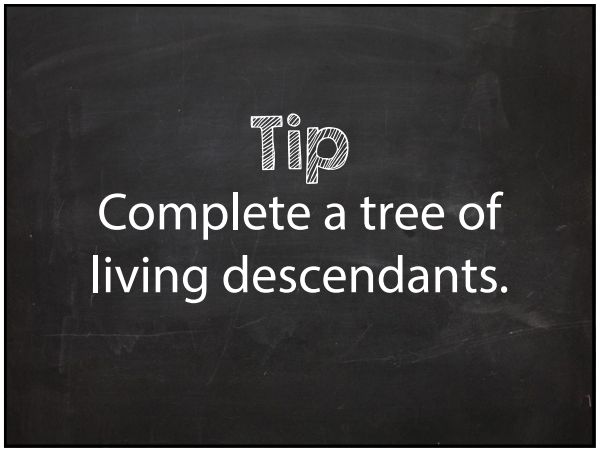

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Reverse Genealogy

- Use vital records and census research up until 1950
- Look for obituaries with children and more current addresses
- Use online resources such as telephone, property, and voter records
- Facebook and Social Media can be your friend!

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Finding the "ideal" DNA participant

- Complete your living tree and identify the best possible descendants
- Find two independent lines that can help with your research
- Try to have back up candidates too
- Caution them about unexpected results

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Appropriate Approaches to Requesting a Stranger's DNA

- Consider what you're asking of people – it could be a sensitive topic
- Carefully explain why you need their participation and provide as much information as you can
- Be truthful and honest with your intentions
- Offer to pay for their test
- Share your genealogical information

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The best ways of Communication

- Facebook or Social Media
- Email
- Phone
- Physical address
- Contacting someone via their own online tree
- Queries in print/online

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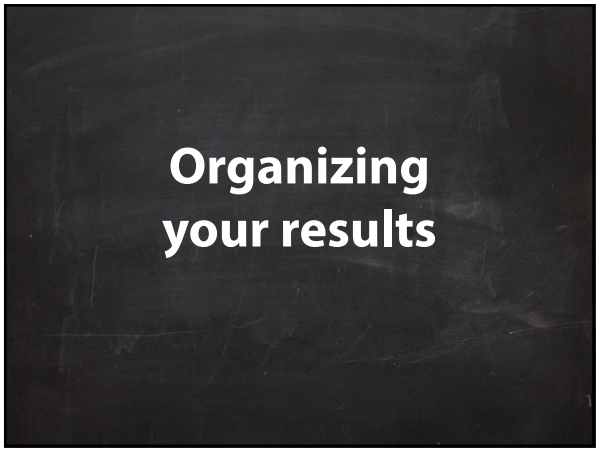

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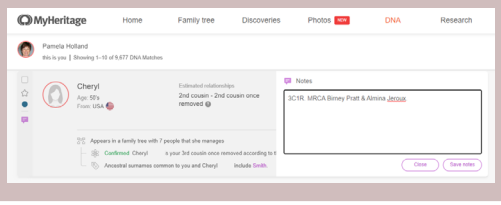
Write Notes

- Most Recent Common Ancestors/Couple
- Surnames and/or Locations



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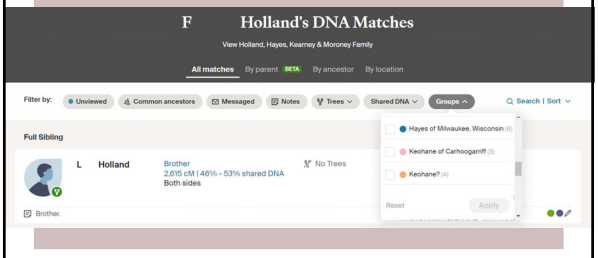
Create Groups and Labels

- Colored dots for ancestral lines or theories



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Interpreting your results

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Working with your Matches

- Start by sorting into your 4 grandparent lines. See the Leeds Method.
- Write Notes
- At Ancestry & MyHeritage use the colored dot groups and labels.
- Work back to older generations.

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Identifying a Match

- Family member you recognize
- Information in their trees
- Shared surnames
- Common locations
- Paternal/Maternal or Parent1/Parent2 side

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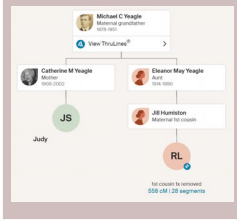
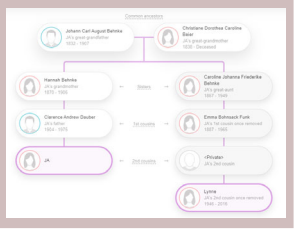
Ancestor Hints

Ancestry
Common Ancestor



MyHeritage
Theory of Family Relativity



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Other ways to Identify a Match

- Build out a match's tree
- Look at Shared Matches
  - Maybe you already identified how you are related to a shared match.
  - Evaluate carefully
  - Triangulate results: matching DNA segments between at least 3 people from different families

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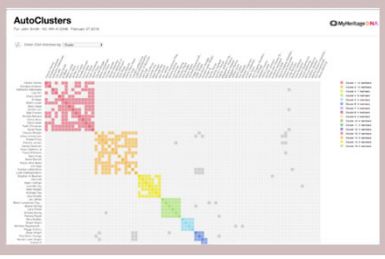
Other Company Tools

- MyHeritage – AutoClusters report



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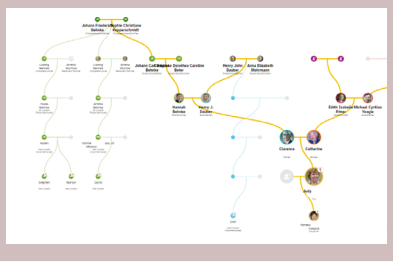
Other Company Tools

- 23andMe – Family Tree



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Learning More

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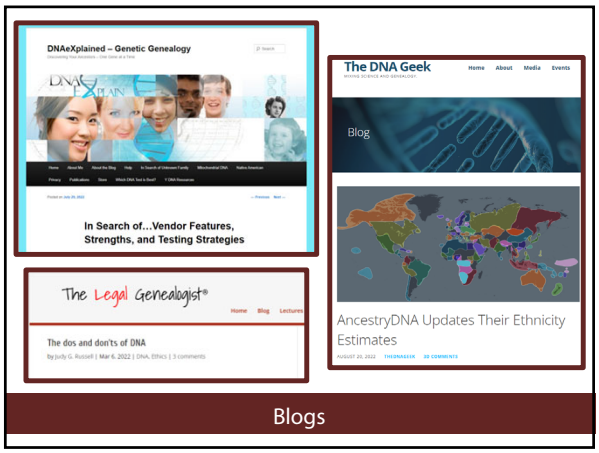
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QUESTIONS?
Hire Research Services
research@nehgs.org
Chat with a Genealogist
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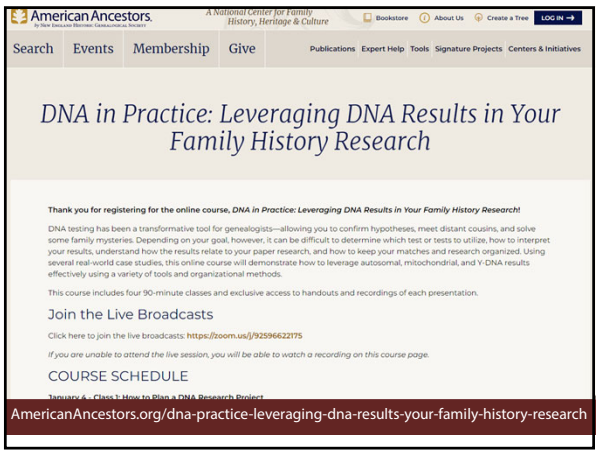
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DNA in Practice: Leveraging DNA Results in Your Family History Research
Thank you for registering for the online course, DNA in Practice: Leveraging DNA Results in Your Family History Research!
DNA testing has been a transformative tool for genealogists—allowing you to confirm hypotheses, meet distant cousins, and solve some family mysteries. Depending on your goal, however, it can be difficult to determine which test or tests to utilize, how to interpret your results, understand how the results relate to your paper research, and how to keep your matches and research organized. Using several real-world case studies, this online course will demonstrate how to leverage autosomal, mitochondrial, and Y-DNA results effectively using a variety of tools and organizational methods.
This course includes four 90-minute classes and exclusive access to handouts and recordings of each presentation.
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COURSE SCHEDULE
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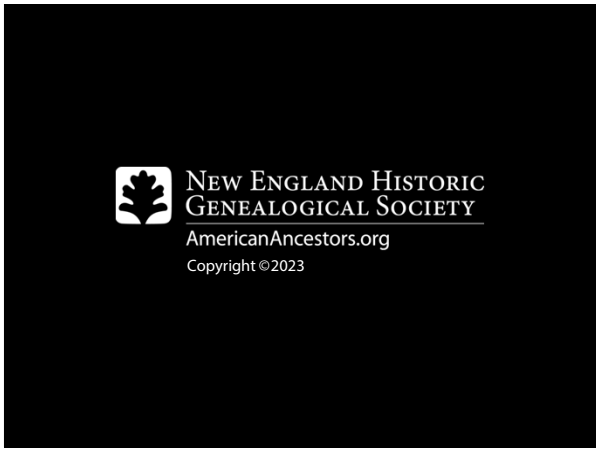
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