

Lineage Linked Social Networking

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1. Introduction

A social networking explosion has occurred over the past several years on the Internet. A wide variety of interdependencies have been utilized to make connections between individuals. In this paper we suggest that genealogical linkages and data form one of the most interesting and productive kind of social networking linkages between people. These linkages may consist of sharing a common ancestor (cousin links), sharing a common geographic heritage, sharing common birthdates, etc. For example, over half of the members of a typical LDS Ward in Utah (300-500 people) can be linked by cousin relationships with current databases such as the Ancestral File or perhaps more with the newer FamilySearch System. The old German adage, “blood is thicker than water”, suggests that genealogical social networks may provide more substance and interest than some of the interdependencies currently being used by social networks.

This paper describes a series of “cousin” programs that we have developed over the past 10 years to develop cousin relationships between people. These systems usually created links between living and deceased individuals. However the same approach can be (and has been) used to create cousin links from one living individual to another. This paper presents some of the technical issues we wrestled with and that will likely be encountered when generating cousin linkages. It also presents interesting and valuable statistics that can be used as a starting point for improving current methodologies. The information and examples here may be of interest to those who are attempting to integrate family history more fully into social networking.

2. Definitions

A *lineage-linked* database is one that stores and allows searches to incorporate *parent-child* relationships. A *social network* is a social structure made of nodes (which are generally individuals or organizations) that are tied by one or more specific types of interdependency, such as values, visions, ideas, financial exchange, friendship, kinship, dislike, conflict or trade.¹ When two people are *cousins*, it means they have a common ancestor that can be traced through lineage linkages. We will treat separately each attempt to use a system as if multiple *users* were involved, even if the same person created more than one account.

3. Six Experimental systems

This paper draws on the design and implementation of six systems that connect individuals to other individuals or groups of other individuals. Often some or all of the target individuals are deceased but the techniques needed to make the connections are the same. However, once the connection is made, usually no social interaction occurs.

- a. ***First Cousins System:*** This first cousin finding system was designed and implemented by Robert Ivie and reported on at the 1996 Gendex Conference in Salt Lake City, Utah. One of the databases used to test its utility interconnected about 80 General Authorities of the LDS Church and their wives. They were sent these results and it was reported that many of them would say “Hi Cousin” in the halls of the Church Offices and President Hinckley commented on how we are really one big family in a General Authority training session. Many of them wrote notes of appreciation for the information. An on-line version of this (called Relationship Finder²) was independently developed by Tom Sederburg of the BYU Computer Science Department.
- b. ***Utah Sesquicentennial System:*** This system was called the Pioneer Ancestral Past and was used on July 24th and 25th of 1997 for the Utah Sesquicentennial. It was developed by a group of BYU Computer Science students working under the direction of Bill Barrett and Evan Ivie. About 70% of the 7,000 people who came to the BYU Harmon Building were given a one-page document describing their Pioneer ancestors. A pioneer was defined to be someone who came to Utah before the completion of the railroad in 1865. A TV anchorman who reported on the system in the evening news said that he knew that he had two Utah Pioneer ancestors but was blown away by the 22 ancestors that he was provided by the system.
- c. ***Nauvoo Cousins:***³ One major goal of this system was to interactively search the database as the visitor entered his pedigree. Once the ancestors of a user have been identified, they can see their relation to 4,607 Nauvoo citizens from the mid 1840’s. This group needed some pre-computation to get reasonable performance.
- d. ***Nauvoo Pageant Cousins:***⁴ This system has been used for the past two years at the Nauvoo Pageant held in July and August in Nauvoo, Illinois. The Cousins kiosk has been located between the Pageant seating area and the Pioneer Games field. Thousands of users try the facility each year and over half of them have been able to identify connections with the early pioneers who are portrayed in the Pageant. The kiosk has 5-6 computer stations, a printer, and a WiFi Internet link. It is staffed by missionaries who assist those who are not very familiar with computer use.
- e. ***Jamestown Cousins:***⁵ This system was produced and made available at the Annual Conference of the National Genealogical Society held in Richmond, Virginia in 2007 to commemorate the 300th anniversary of the settling of Jamestown, Virginia. The database consists of 792 original settlers of Jamestown.
- f. ***Kansas City Cousins:***⁶ This system was produced and made available at the Annual Conference of the National Genealogical Society held in Kansas City, Missouri in 2008. This system was developed to use the new FamilySearch database.

One page examples of the three online versions can be found in Appendix A. Systems c-f were designed and developed by Peter Ivie.

4. Implementation Approach

Each of these systems required an initial preparation phase where the members of the target group (General Authorities, Utah Pioneers, Nauvoo Pioneers, Nauvoo Pageant characters, Jamestown Settlers and Kansas City Notables) were identified and their ancestors were collected. The ancestors generally came from the Ancestral File, but recently the Family Search System has been used.

Once the database for the target group was created, the system was ready for user queries. Users were first required to identify themselves. The system would then attempt to tie the user into the database the target group was created from. There are various ways this was done.

The final step was to match the ancestry of the user with the ancestry of the target group, to calculate relationships, and to display or print results. A special case occurred when a member of the target group matched directly with the ancestry of the user. When this occurred the target group member was designated as a direct ancestor. In the other cases the relationship was designated as a cousin or niece/nephew relationship.

The Nauvoo, Nauvoo Pageant, and Jamestown systems use the same Ancestral File based database. At the National Genealogical Society Conference in 2007 non-LDS genealogists at this conference had trouble connecting into the Ancestral File (which is largely LDS). Efforts since then have been focused on using the new FamilySearch system and other databases.

5. Ancestor discovery

The first cousins system required each user to have a GEDCOM file. There was no set process by which this pedigree was created. This created compatibility issues. Usually it was created for them by someone else based on a written pedigree and then run through the system with a group of files.

The system designed for the Utah Sesquicentennial had users fill out a simple pedigree chart their name, their parents' names, and their grandparents' name. A team of data entry genealogists would then enter the data and a program would attempt to find the individual's ancestors in the Ancestral File. The ancestors would then be matched against a database of Utah Pioneers. A report was then generated describing the Utah Pioneer ancestor.

BYU's Digital Roots system is a similar system that is also based on the Ancestral File and available on the internet. A user enters the AFN (Ancestral File Number) and the system reports back relations to notable historic individuals.

The interactive pedigree creation approach from the Nauvoo cousins system helped to minimize data entry by filling in known ancestors as quickly and easily as possible and also allows entry of ancestors beyond great grandparents. This also allows the user to verify their ancestry and get or provide more information if necessary.

A new FamilySearch username/password could also be used to simplify the creation of a pedigree and is currently being worked on. Other online sources of pedigrees could also be used.

a. Ancestor recall

It is useful in some situations to be able to create a fairly complete pedigree for someone based on information they can remember. Very few people (even the ones that go to genealogy conferences) seem to carry a copy of their pedigree around with them in any form other than what they can remember. When asked about their pedigree, many rely on a relative to track the most recent information on particular lines. Some of the more dedicated people were seen on cell phones asking for a little bit more information than they could remember. Figure 1 contains statistics about what people can recall or obtain at a computer away from their home.

Note: A user's pedigree is made up of couples consisting of 4 fields; the husband's given name and surname and the wife's given name and maiden name.

User recall of ancestor couples

	Grandparents	Great Grandparents	Great Great Grandparents
Total non blank couples	6188	3777	1155
>1 character for all 4 fields	82%	64%	73%
>1 character for only 3 fields	7%	6%	5%
>1 character for only 2 fields	6%	11%	9%
>1 character for only 1 field	4%	18%	12%
Missing wife's maiden name	14%	31%	24%
Missing husband's given name	7%	22%	14%
Missing wife's given name	10%	29%	22%
Missing husband's surname	1%	1%	1%

Figure 1

Couples generated by a match earlier on in the pedigree are not included. Don't be misled by the "total non blank couples" figures. The information has to be manually entered by the user.

67% of the total users were able to find a match in the Ancestral File for at least one of the couples in their pedigree.

b. Ancestor validation (by age)

It is important to keep the data as accurate as possible. Dates are a good place to start because they are one of the simplest forms of vital information. Here are some rules that could be helpful in preventing date inaccuracies in a lineage-linked database.

Sean Stewart from England became the world's youngest father on record at the age of 12.⁷ Lina Medina from Peru became the world's youngest mother on record at the age of 5.⁸ However in my pedigree on the new FamilySearch, there are 1,528 ancestors that had children not only earlier than the world's records, but even before they were born themselves. I chose to stop downloading any further ancestors on a line where this occurred. About 2% percent of the parents in my pedigree fell into this category (the parent's birth date occurred after their child's birth date).

Adriana Iliescu became the world's oldest mother on record at the age of 66.⁹ Nanu Ram Jogi became the world's oldest father on record at the age of 90.¹⁰ Although it is impossible for a mother to have a child after she is dead, a father could theoretically have a child at least up to 375 days (the longest pregnancy)¹¹ after his death. Anything more than that probably should not appear in a pedigree. Artificial insemination¹² may extend this limit, but shouldn't yet be much of a consideration in a person's pedigree. It may also be helpful to note that the shortest known pregnancy was 21 weeks 6 days after conception.¹³

However, due to the nature of genealogical information, a person's age may not be an exact science. The new FamilySearch includes a range of possibilities (based on Julian Day¹⁴) for each date. It appears as earliest and latest "astro" fields. Exact dates have the same earliest and latest astro value. Imprecise dates such as a year only, will include the range of dates between earliest and latest astro value. These can be used to provide an age range which can be used and refined with rules based on the other limits in this section. Ages of grandparents and beyond could also be considered.

Figures 2 and 3 show the distribution curve for my ancestors as they appear in new FamilySearch. This only includes information where the birth date for both the parent and child has a range (accuracy) of within 1 year.

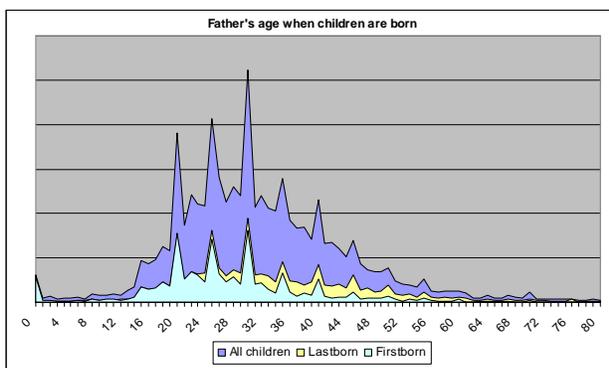


Figure 2

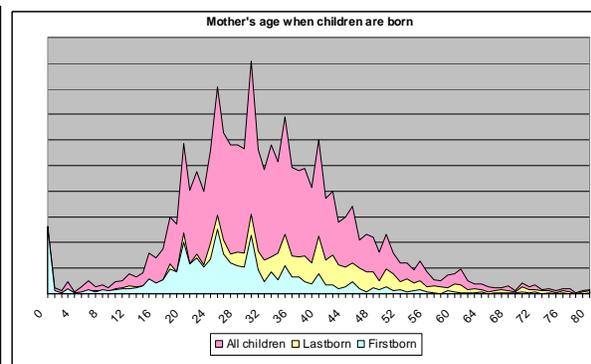


Figure 3

Note: The peaks at five year intervals (20, 25, 30, etc) might be due to a human tendency to estimate on those intervals.

There has also been some work published about estimating missing dates.¹⁵ The author has implemented his ideas and the source code is available online for use. Those estimations could also be helpful in filling in blank dates.

c. Ancestor retrieval

It is impossible for one website to contain all lineage-linked data that could be used for connecting users. A significant amount of time was spent extracting, formatting, and indexing just over 30 million individuals from the Ancestral File for the Nauvoo database. Much of the research in this paper and most of the examples are based on that data. The data made available by the FamilySearch API is much more vast, organized, and complex as shown in Figure 4.

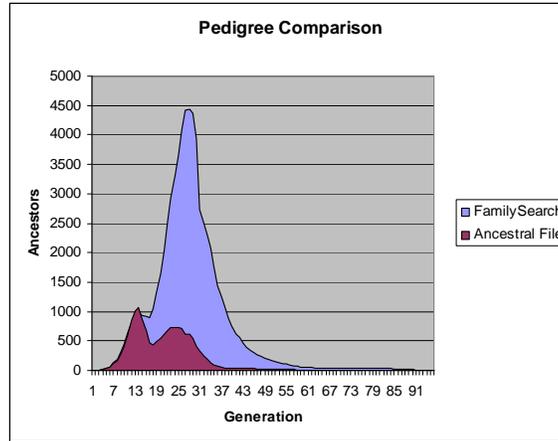


Figure 4

Note: There are 3 generations where the Ancestral File pedigree is a little bit larger than the FamilySearch pedigree, but it is quickly outstripped.

Note: The downloaded results of the FamilySearch pedigree vary quite a bit as relationships get updated and depending on which relationships are ignored as errors.

Note: I did not ignore individuals as errors in the Ancestral File unless a relationship pointed to a person already in my pedigree.

d. Ancestor matching

Searching for individuals often produces lots of results in a large database. Most people don't have the time or patience to wade through a huge list. By searched with *couples* instead of individuals, the number of results was greatly reduced. A match (exactly one result for each member of the couple) was found for 36% percent of non-blank grandparent couples.

This algorithm did not work quite as well in new FamilySearch. The child's name and gender for each couple provided enough information to satisfy the basic match requirements, but it was not available 100% of the time. Only 1% of the grandparent couples had a match of at least "High" quality and exactly one result. In an interactive system the user could choose from the list, but that was not a part of the Ancestral File system from which the data was drawn for the comparison. Lowering the threshold down to "Medium" quality, 15% of the grandparent couples resulted in one match. At "Low" quality (or greater), 29% resulted in one match. This came close to the 36%, but it was much lower than expected.

Using the search service in new FamilySearch, only about 6% of the couples returned one result with a higher score than the other results. We didn't draw a line (or threshold) at exact scores because the documentation indicated that scores are only relative.

6. Cousin Discovery

Once the user's pedigree has a connection into the database cousins can be found. This is where it is important to make the user's hard work pay off.

a. Cousin Results

For users who entered at least one couple that matched in the Ancestral File database 82% were related to Nauvoo Pageant characters. For Jamestown colonists 83% of the users were related.

Figures 5 and 6 both show all relations between the users and the target groups. Notice the peak for Nauvoo is at 5th cousins and a peak for Jamestown is at 1st cousins.

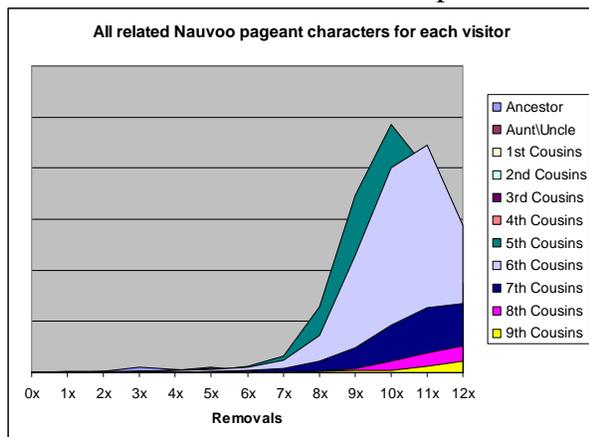


Figure 5

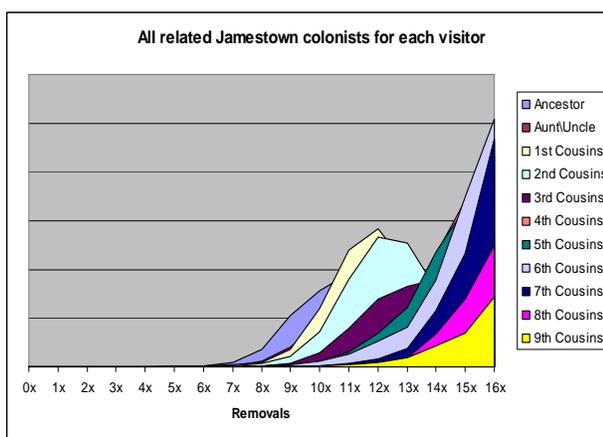


Figure 6

Figures 7 and 8 represent only the closest target individual for each user. Notice the peak is now at 4th cousin for Nauvoo and direct ancestor for Jamestown.

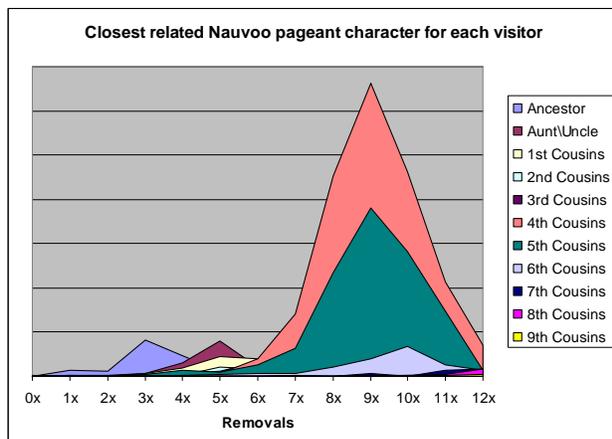


Figure 7

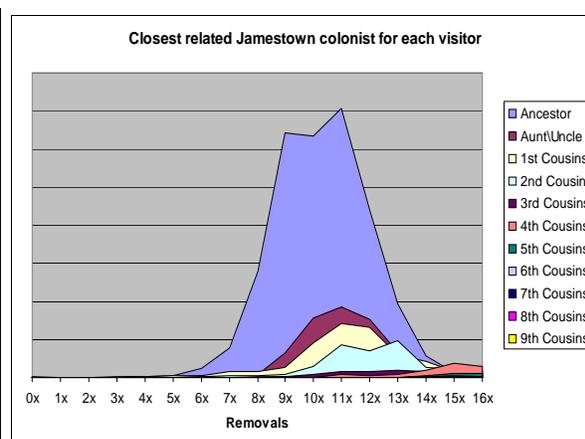


Figure 8

For both these categories, the distance between the peaks is 4 generations. That is a span of over 50 years per generation from a cousin perspective. It is difficult to tell if this holds true for other time periods or groups.

The obvious tapering off after the peak reflects the effectiveness of the pre-computation described in the next section. Put in other terms, the data shows that 98% of the users are at least 6th cousins with a Nauvoo Pageant character and 95% are 5th cousins. For Jamestown colonists 97% of the users are at least 3rd cousins and 94% are 2nd cousins to a Jamestown colonist. Focusing on these closer relationships greatly improves the scalability of a cousin system.

b. Cousin Pre-computation

The Nauvoo citizens target group was much bigger than previous groups at 4,607 individuals from the Ancestral File who lived in Nauvoo in the mid 1800's. Comparing each user's thousands of ancestors with millions of Nauvoo citizens' ancestors wasn't going to be very scalable on the internet without pre-computing some of the relations. The basic items needed are a pointer to the famous person and to the cousin, the relationship of the cousin to the famous person (if desired for performance), and (if desired) a link to the previous person in the path back to the cousin (to reconstruct exactly how they are related). There was a little bit more stored for figures 9-10, but not a lot. To store the data for all relatives of the Nauvoo citizens up to 9th cousins took 16.5GB. Figure 9 shows that 90.5% of the users who are at least 9th cousins with Nauvoo citizens are also a descendant of at least one of the Nauvoo citizens.

Nauvoo Citizens	# of relatives	Cumulative space needed	Cumulative space per person in target group	Cumulative percent of users connected at least once
Ancestor	8,088,710	303 MB	66 KB	90.5%
Aunt/Uncle	7,506,567	585 MB	127 KB	93.1%
1st Cousins	6,071,074	812 MB	176 KB	95.0%
2nd Cousins	9,231,779	1,158 MB	251 KB	97.0%
3rd Cousins	54,771,836	3,211 MB	697 KB	98.8%
4th Cousins	247,030,665	12,469 MB	2,707 KB	99.8%
5th Cousins	35,157,712	13,787 MB	2,993 KB	99.8%
6th Cousins	35,812,610	15,129 MB	3,284 KB	99.8%
7th Cousins	18,912,991	15,838 MB	3,438 KB	99.9%
8th Cousins	11,432,295	16,267 MB	3,531 KB	99.9%
9th Cousins	7,471,120	16,547 MB	3,592 KB	100.0%

Figure 9

Jamestown Colonists	# of relatives	Cumulative space needed	Cumulative space for each person in the target group	Cumulative percent of users connected with closest relative
Ancestor	2,674,111	139 MB	176 KB	61.9%
Aunt/Uncle	1,921,871	239 MB	302 KB	75.2%
1st Cousins	3,509,957	422 MB	532 KB	86.4%
2nd Cousins	3,682,548	613 MB	774 KB	93.8%
3rd Cousins	4,472,913	846 MB	1,068 KB	96.5%
4th Cousins	7,458,135	1,234 MB	1,558 KB	98.8%
5th Cousins	11,819,174	1,848 MB	2,334 KB	99.4%
6th Cousins	13,749,587	2,564 MB	3,237 KB	99.7%
7th Cousins	15,557,941	3,373 MB	4,259 KB	100.0%
8th Cousins	11,562,176	3,974 MB	5,018 KB	100.0%
9th Cousins	12,492,031	4,624 MB	5,838 KB	100.0%

Figure 10

By only pre-computing up to 3rd cousins, the table size for Nauvoo Citizens is reduced from 16.5GB to 3.2GB while only excluding 1.2% of the users from having a quick match. A more laborious linkage search could find the cousins for that 1.2% but it would take more time. This could be useful when scaling up the size of the target group.

Looking at figures 9 and 10 together is helpful in comparing the amount of space needed for each person in a target group from the 1600s vs. 1800s. Pre-computing just the ancestors for Nauvoo Citizens only takes 66KB per person, but it takes 176KB per person for the Jamestown colonists.

c. Cousin Path

As soon as someone sees they are related to the target individual, they usually want to see how. To make the pre-computed tables feasible, only the closest relationship is considered for any given target individual and related individual. As mentioned already, this is done by storing a pointer to the previous individual in a path for each target and related individual pair.

Only occasionally have I been asked about other cousin paths for a given target individual. However, if a more complete picture is needed, multiple pointers can be stored for each target and related individual pair. If done properly this will provide quick results for the closest relation, with the ability to re-create each path between the target and related individuals.

7. Conclusions

Even using an old database (Ancestral File), at least half of our users were able to find at least one cousin. Using a more complete database (like new FamilySearch) it will be possible to obtain more complete pedigrees. More complete pedigrees means more and closer relatives.

Due to the differences between online sources of lineage-linked data, they should be merged into a common database ahead of time so that the user doesn't get confused with widely varied results while trying to create their pedigree. To benefit from a more complete database the user should be presented with options. This adds complexity to the user interface, but reduces the necessary recall.

A significant effort should be made to clean the database ahead of time before a user arrives at the site. This should minimize the amount of effort required for the user to provide their pedigree. This can include removing wrong or inapplicable information, fixing existing information, and even guessing about missing information. Information from existing authorities like the new FamilySearch can be used to assist in these efforts.

Each of the systems mentioned expected the creation of a target group. Strictly speaking this is not necessary. Users might also want to find out how they are related to other users (social networking). Treating the target group as individuals can simplify the whole process. For individuals that do not appear in the database, the same pedigree creation tools already discussed for the user can apply for the target group's individuals. They can be treated like users but be flagged as a part of the target group.

When a target group is involved, finding all of their ancestors, aunt/uncles, first, and/or second cousins ahead of time will provide a quick relative for almost all users. Others will have to wait a little bit longer as the complete pedigrees are compared. The size or time period of the target group does not appear to affect the number of users that are related to it. However, they do affect how closely the users are related. As the target group size increases, the cousin depth required for a quick relative can be decreased even more.

Target groups from earlier periods (i.e. more descendants) will have a much better chance of having a close relationship to the user. This means that finding the relationships between living users is more difficult than between the living and dead since both pedigrees have to be fairly complete.

Finding the closest related target individuals can be very fast. If the algorithms for the system are careful, all cousin paths can be easily re-created once related target individuals are identified.

Many users have been especially excited to make a link to someone that they did not know they had a relationship to. If this were augmented by additional linkages such as common birth, marriage, and/or death date, day or places, even more interest could be generated. Social networks have started down this path (Geni, Facebook, etc) but there is much more that can be done.

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- ¹ http://en.wikipedia.org/wiki/Social_network
 - ² It is currently available at <http://roots.cs.byu.edu/digroots/>
 - ³ It is currently available at <http://ldscousins.org/>
 - ⁴ It is currently available at <http://nauvoopageantcousins.org/>
 - ⁵ It is currently available at <http://jamestowncousins.org/>
 - ⁶ It is not yet available on-line.
 - ⁷ <http://www.helium.com/items/50074-the-youngest-parents-ever>
 - ⁸ <http://www.incrediblebirths.com/Worlds-Youngest-Mother.html>
 - ⁹ <http://www.incrediblebirths.com/Worlds-Second-Oldest-Mother.html>
 - ¹⁰ <http://www.dailymail.co.uk/news/article-476980/Worlds-oldest-father-21st-child-90.html>
 - ¹¹ <http://www.time.com/time/magazine/article/0,9171,797153,00.html>
 - ¹² <http://www.independent.co.uk/news/dead-father-forced-off-birth-certificate-1125266.html>
 - ¹³ http://www.incrediblebirths.com/worlds_earliest_pre-term_baby.html
 - ¹⁴ http://en.wikipedia.org/wiki/Julian_day
 - ¹⁵ <http://homepages.cs.ncl.ac.uk/brian.randell/Genealogy/Brox/dissertation/dissertation.html>

Appendix A

You are related to the following:

Direct Ancestors (15)

[Susannah Wilkinson](#) is your 3rd great grandparent.

[Susan Hammond](#) is your 3rd great grandparent.

[James Russell Ivie](#) is your 3rd great grandparent.

[John Barton](#) is your 3rd great grandparent.

[Chauncy Warriner Porter](#) is your 3rd great grandparent.

[Rheuma Lancaster](#) is your 3rd great grandparent.

[Amy Or Emma Sumner](#) is your 3rd great grandparent.

Nathaniel Ashby is your 3rd great grandparent.

[Eliza Avery Whiting](#) is your 3rd great grandparent.

[Eliza Mckee Fausett](#) is your 3rd great grandparent.

[Noah Rogers](#) is your 4th great grandparent.

[Lydia Chamberlain](#) is your 4th great grandparent.

[Nancy Warriner](#) is your 4th great grandparent.

[James Jones](#) is your 4th great grandparent.

[Eda Hollister](#) is your 4th great grandparent.

Aunt/Uncles (23)

1st Cousins (3)

2nd Cousins (11)

3rd Cousins (91)

4th Cousins (473)

5th Cousins (51)

6th Cousins (27)

7th Cousins (8)

8th Cousins (4)

[Back to Pedigree](#)

Nathaniel Ashby is your 3rd great grandparent

Nathaniel Ashby - 3rd Great Grandparent -
William Hardin Ashby - 2nd Great Grandparent -
Robert "I" Ashby - Great Grandparent -
Ruth Ashby - Your Grandparent -
Evan Leon Ivie - Your Parent -
Peter Ivie - You -

You are related to the following:

- [Louisa Tanner](#)
is your 3rd cousin 6 times removed
- [Brigham Young](#)
is your 4th cousin 9 times removed
- [Mary Ann Frost](#)
is your 4th cousin 9 times removed
- [Phoebe Whittemore Carter](#)
is your 5th cousin 5 times removed
- [Heber Chase Kimball](#)
is your 5th cousin 5 times removed
- [Eliza Roxey Snow](#)
is your 5th cousin 5 times removed
- [Emma Hale](#)
is your 5th cousin 7 times removed
- [Anna Bibbins Chaffee](#)
is your 5th cousin 7 times removed
- [Wilford Woodruff](#)
is your 6th cousin 5 times removed
- [Vilate Murray](#)
is your 6th cousin 6 times removed
- [Parley Parker Pratt](#)
is your 6th cousin 6 times removed
- [Hyrum Smith](#)
is your 6th cousin 9 times removed
- [Joseph Smith](#)
is your 6th cousin 9 times removed
- [Mary Fielding](#)
is your 8th cousin 6 times removed

[Back to Pedigree](#)



Brigham Young
is your 4th cousin 9 times removed

/ Samuel "dea. Samuel" ... Stone \

Nathaniel Stone	- Siblings -	Susanna (Susannah) Stone
Eunice Stone	- 1st cousins -	Ebenezer Goddard
Huldah Bangs	- 2nd cousins -	Susannah Goddard
Daniel Clark	- 3rd cousins -	Abigail Nabby Howe
Mercy Clark	- 4th cousins -	Brigham Young
Eunice Byington	- Once removed -	
Philemon Rogers	- Twice removed -	
Noah Rogers	- 3 times removed -	
Theodore Rogers	- 4 times removed -	
Hannah Lucretia Rogers	- 5 times removed -	
Hannah Cropper	- 6 times removed -	
Ruth Ashby	- 7 times removed -	
Evan Leon Ivie	- 8 times removed -	
Peter Ivie	- 9 times removed -	



Brigham Young was born June 1, 1801 to John Young and Abigail Howe in Whitingham, Vermont. He was carpenter and blacksmith. He read the Book of Mormon shortly after its publication in 1830 and was converted to the Church. His first mission was to Canada in 1832. After his first wife died in 1833, he joined the Saints in establishing the community in Kirtland, Ohio. He was ordained an Apostle and member of the Quorum of the Twelve Apostles on February 14, 1835. He helped establish the city of Nauvoo, Illinois and served on a number of missions for the Church. He was known for his unwavering faith in the Church and his loyalty to Joseph Smith. After the death of Joseph, Brigham was sustained as President of the Church and led the Saints to Utah's Salt Lake Valley. There he directed the settlement of hundreds of communities and is called the "American Moses".

You are related to the following:

Direct Ancestors (11)

- William Waters** is your 8th great grandparent.
- [Edward Waters](#) is your 9th great grandparent.
- [Phillip Parker](#) is your 9th great grandparent.
- [William Andrews](#) is your 9th great grandparent.
- [John Michael](#) is your 9th great grandparent.
- [Peeter \(Peter\) Cropper](#) is your 9th great grandparent.
- [John Wise](#) is your 10th great grandparent.
- [Adam Thoroughgood](#) is your 10th great grandparent.
- [Francis Mason](#) is your 11th great grandparent.
- [George Calvert](#) is your 11th great grandparent.
- [Edmund Norton Scarborough](#) is your 11th great grandparent.

[Aunt/Uncles \(7\)](#)

[1st Cousins \(10\)](#)

[2nd Cousins \(3\)](#)

[3rd Cousins \(1\)](#)

[4th Cousins \(8\)](#)

[5th Cousins \(7\)](#)

[6th Cousins \(7\)](#)

[7th Cousins \(11\)](#)

[8th Cousins \(4\)](#)

[Back to Pedigree](#)

William Waters is your 8th great grandparent

- William Waters - 8th Great Grandparent -
- William Waters - 7th Great Grandparent -
- William Waters - 6th Great Grandparent -
- George Waters - 5th Great Grandparent -
- Elizabeth Handy Waters - 4th Great Grandparent -
- George Waters Cropper - 3rd Great Grandparent -
- Thomas Waters Cropper - 2nd Great Grandparent -
- Hannah Cropper - Great Grandparent -
- Ruth Ashby - Your Grandparent -
- Evan Leon Ivie - Your Parent -
- Peter Ivie - You -