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Exploring Identity Through Genetic and Genealogical Research: Development of a Collaborative Course Between Humanities and Biology

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About the Authors

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Exploring Identity Through Genetic and Genealogical Research: Development of a Collaborative Course Between Humanities and Biology

by **Jim Doan and Emily Schmitt**

Abstract

In this paper, data from student projects completed in their HONR 1000N: Genetics and Genealogy course, taught during winter 2010, are presented. Students traced their deep ancestry through mitochondrial and Y-chromosome DNA analysis, as well as more recent ancestry, using genealogical databases and family histories. Frequently, students were challenged or pleasantly surprised by the information they gleaned. Genetic and genealogical research can provide clues to one's identity and ethnic background, as well as potential medical conditions.

Introduction

Genetics and genealogy have become increasingly popular topics of study, especially with the advent of television shows such as *Faces of America* (PBS, 2010) and *Who do you think you are?* (NBC, 2010). We are generally becoming curious to discover our "roots." Of course, we

all have two parents and most of us know who they are, but we also have four grandparents, eight great-grandparents, and sixteen great-great-grandparents, etc., so that by the time we go back in our genealogical history seven generations, there are 128 direct ancestors, people that directly gave rise to us. Most of us do not even know any details about most of these people (Stone and Lurquin, 2007). With increasing frequency people, especially those living in the United States, a country with a relatively short recorded history, want to find out details of their ancestral heritage. For example, they may typically seek answers to the questions, “Who are my ancestors?” and “Where did I come from?” We tend to have a feeling of wanting to be remembered by the world, and that memory might be strongest within our family heritage group. Additionally, we may wish to document diseases or biological conditions that affected our ancestral line so we can be sensitive to these potential issues in ourselves and our descendants. With increasing frequency, such topics are being highlighted in popular as well as scientific publications. For example, discovering methods of researching one’s own genealogy has been making the cover of popular magazines, such as *Time* (April 19, 1999), and ideas surrounding human evolution, i.e. tracking mutations to identify distant human migration patterns, have been making the cover of *Scientific American* (October 2005).

The search term “genealogy and genetics” is quickly becoming one of the most often-searched topics on the Internet (Stone and Lurquin, 2007). There are many publicly available databases where one may find census, marriage, and birth and death records of ancestors, and many databases are available for a fee or through libraries (Garvey, 2009). Additionally, a growing number of computer programs is available for organizing one’s genealogical records, such as Legacy (Millennia Corporation, 2008) and My Heritage (www.myheritage.com) (figure 1). These link to other family genealogies to assist users in finding additional ancestors by searching all the family databases in their systems. In years past, families might have hired a professional genealogy researcher for this type of work; while families may still elect to do this, it has become much easier for individuals to compile their own family histories with a relatively modest amount of training. When studying genetics and genealogy, people will become interested in two time-scales of study: near ancestry, which includes the historical record of one’s ancestors; perhaps dating back several hundred to a thousand years (Powell, 2008) and deep ancestry, dating back up to 200,000 years and the dawn of humanity (Wells, 2006).



Figure 1: An example of the type of ancestry chart available via the genealogy program, *Legacy* <http://www.legacyfamilytree.com/>

As the genetic tools available to study human ancestry become more complex, increasingly more detailed questions are able to be addressed. For example, the Neanderthal genome was completely sequenced in 2010 (Green et al., 2010), enabling comparison to human DNA. Additionally, many studies have sought to compare human DNA to that from chimpanzees, our closest non-human, primate relatives. The complete chimpanzee sequence was published in 2005 (The Chimpanzee Sequencing and Analysis Consortium, 2005). Still other studies have involved the sequencing of people of African heritage, including Archbishop Desmond Tutu, who hails from the African Bantu community, and a man named !Gubi (“!” represents a click sound unique to the Bantu languages) who is a hunter-gatherer from the Khoisan community (Schuster et al., 2010). The people of the African continent have some of the most diverse genomes, since they represent the ancestral origin of all modern humans (Wells, 2002). Wells explains the diversity of African populations as being like a grandmother’s soup recipe, rich with ingredients, and as the recipe is made by her descendants some ingredients are not available, so many get left out while a few new ones may get added (Wells, 2002). In fact, the Khosian (native African community) is currently so genetically diverse that comparing the genomes of two individuals from this community would show as much diversity as comparing the genomes of a person from Asian or European descent (Ledford, 2010).

Over the past twenty years, DNA testing has revolutionized the way scientists study human migration and cultural identity. Having collected genetic samples from people all over the

world, scientists now have a better understanding of how populations moved out of Africa (where *Homo sapiens* originated perhaps 200,000 years ago) and into Europe, Asia, and the Americas. Based on these studies, they have divided DNA into large "super-families" called "haplogroups." It is possible to predict a person's DNA haplogroup from the results of a 12-marker or 25-marker DNA test, although sometimes an additional test, called a "SNP" (single nucleotide polymorphism) test, is needed for confirmation (Cheek/Chick DNA Project, 2010; Doan, 2010; National Geographic Society, 2011) .

When analyzing one's DNA for ancestral markers, typically either mitochondrial DNA (mtDNA) or Y-chromosome DNA (Y-DNA) is examined. Using mtDNA is particularly interesting for studies of ancestry because it is relatively small (approximately 16,000 base pairs) and is almost strictly maternally inherited (Siguroardottir et al., 2000). In other words, the mtDNA that individuals have is the same as their mother's, which is the same as her mother's going all the way back in time. The way that this DNA can be used to trace ancestry is that over time small changes in the mtDNA that do not affect gene expression accumulate and are passed down the maternal line. By tracing the presence of these changes among world populations, we can begin to understand how human migrations most likely occurred (Cold Spring Harbor Laboratory, 2011). A similar approach may be done using Y-DNA. Y-DNA is also relatively small (approximately 58 million base pairs), but larger than mtDNA (Jobling and Tyler-Smith, 2003). Using Y-DNA will only document the male lineage (in males) since this type of DNA is only passed down from father to son. Females do not possess Y-DNA.

Haplogroups are identified by specific markers (or mutations) on the Y chromosome (for males) or mitochondrial mtDNA (which both men and women possess). Both types of genes mutate at a set rate, which allows scientists to predict when particular lineages split off from one another. The theory behind this type of genetic study is that all descendants of a common ancestor will share particular markers, unless there have been additional subsequent mutations. These haplogroups have been mapped on a worldwide basis (Wells, 2002; 2006). See, for example, this map showing Y-chromosome and mtDNA distributions: <http://www.scs.uiuc.edu/~mcdonald/WorldHaplogroupsMaps.pdf>. It presents approximate percentages of major haplogroups for specific countries or cultures. Additional interactive maps of Y-haplogroup distributions are available online from the DNA Heritage Corporation: <http://www.dnaheritage.com/ysnptree.asp>.

Course and Research Approach

In October 2006, Dr. Spencer Wells, creator of the Genographic Project, which was launched to document human migration patterns and cultural roots (NGS, 2011), visited Nova Southeastern University (NSU) to speak on the annual (2006-2007) theme, "Identity," of the Farquhar College of Arts and Sciences (<http://www.fcas.nova.edu/articles/dss/spencerwells%5Cindex.html>). Now, in the academic year 2010-2011, we are once again studying the theme of Identity. As a result of the focus on this theme in the college, a specific collaboration was started between the Divisions of Humanities and of Math, Science and Technology in the form of an honors seminar entitled, "Genetics and Genealogy." This course was first run in Fall 2007 and again in Winter 2010, with the anticipation of being offered approximately every two years.

This report will focus on details regarding the most recent iteration of the course (Winter 2010). The subject of genetics and genealogy especially lends itself to collaboration among the humanities and sciences and this course was approached as such: a true collaboration. Class readings were assigned and discussed from Stone and Lurquin, 2007, as well as relevant readings from the primary literature. Discussions were held on various topics, ranging from human anthropology, Neanderthal and Cro-Magnon Man, development of language, applications of molecular markers to determine possible migratory patterns, and genes and culture in medicine. Each class session was a dialogue between students and instructors representing the two disciplines (humanities and biology). In addition to studying relevant topics in the fields of anthropology and genetics, students were also instructed in methods of researching their near ancestry using available family interviewing techniques and searching the relevant genealogical databases. All the students participated in the Genographic Project (NGS, 2011) by having their DNA or a family member's DNA tested for specific markers representing various human migration patterns (haplotypes). Additionally, students' DNA results could be shared with Family Tree DNA since the two organizations (Genographic Project and Family Tree DNA) collaborate and share databases (www.familytreedna.com). As final course projects, students compiled information regarding their near and deep ancestry and presented their results in the form of a family history narrative (paper) and a presentation (PowerPoint) to the rest of the class.

Summary of Student Results

The results of the student projects consist of two distinct types of information. The genetic tests were used to answer some of the students' questions regarding their deep ancestry, and the search of genealogical records was able to answer some of the students' questions regarding their near ancestry. There were a total of 17 students (and two instructors) participating in the Winter 2010 course: these individuals were from many different cultural backgrounds (Figure 2).



Figure 2: Students who participated in final course projects during the Winter 2010 semester at

Nova Southeastern for the honors course, HONR1000N: *Genetics and Genealogy*, a collaboration between humanities and biology.

Genetics—Deep Ancestry Highlights

In total, the 17 students completed 35 genetic tests of their deep ancestry as part of the Genographic Project (NGS, 2011). Nineteen mtDNA tests and 16 Y-DNA tests were completed. All students completed one genetic test (mtDNA only) and most (88%) completed at least one mtDNA test and one Y-DNA test. One student completed two mtDNA and one Y-DNA test (for a total of three tests). One of the students completed a related honors thesis project (Douma, 2010) and presented a summary of the research at the National Meeting of *Beta Beta Beta*, National Biological Honors Society, in June 2010 at Ft. Lewis College, Durango, CO. As part of this more extended project, the student completed two mtDNA tests (one for her maternal lineage and one for her father's maternal lineage) and two Y-DNA tests (one for her father's lineage and one for her mother's father's lineage). These tests involved 25 markers instead of the usual 12 and were performed by the Family Tree DNA Company (www.familytreedna.com). This student designed a more specialized procedure to test for specific marker differences known as single nucleotide polymorphisms (SNPs) identifying subpopulations in her ancestry (Douma, 2010).

Another student presented her research as a result of this course at the annual Undergraduate Student Symposium at NSU (Bromberg, 2010). Upon completion of the genetic testing via the Genographic Project students were given access to deep ancestral information via a secure password on the Genographic project Web site (www.nationalgeographic.org/genographic). In this way, all the students were able to access summary information concerning the results of their specific mtDNA test (Figure 3) and their specific Y-DNA test (Figure 4). The 19 mtDNA tests completed yielded results of 14 unique haplogroups. There was one each of the following haplogroups: B, F, H, HV, HV1, J*, M, N1*, T, U, U*, U4, and U5. Three class members were in haplogroup J* (Figure 5). The 16 Y-DNA tests belonged to 10 unique haplogroups, with half of them belonging to the R group. There was one each of the following haplogroups: I1, L, R1a, R1a1, and R1b1b. Two students belonged to each of the following haplogroups: E1b1b1, G, J2, R1b, and R1b1b1, while there were three students belonging to haplogroup R1b1b2 (Figure 6).



Figure 3: Example of the types of results students were able to obtain using the Genographic Project's mitochondrial DNA test. Additional examples are viewable at www.nationalgeographic.com/genographic



Figure 4: Example of the types of results students were able to obtain using the Genographic Project's Y-DNA test. Additional examples are viewable at www.nationalgeographic.com/genographic

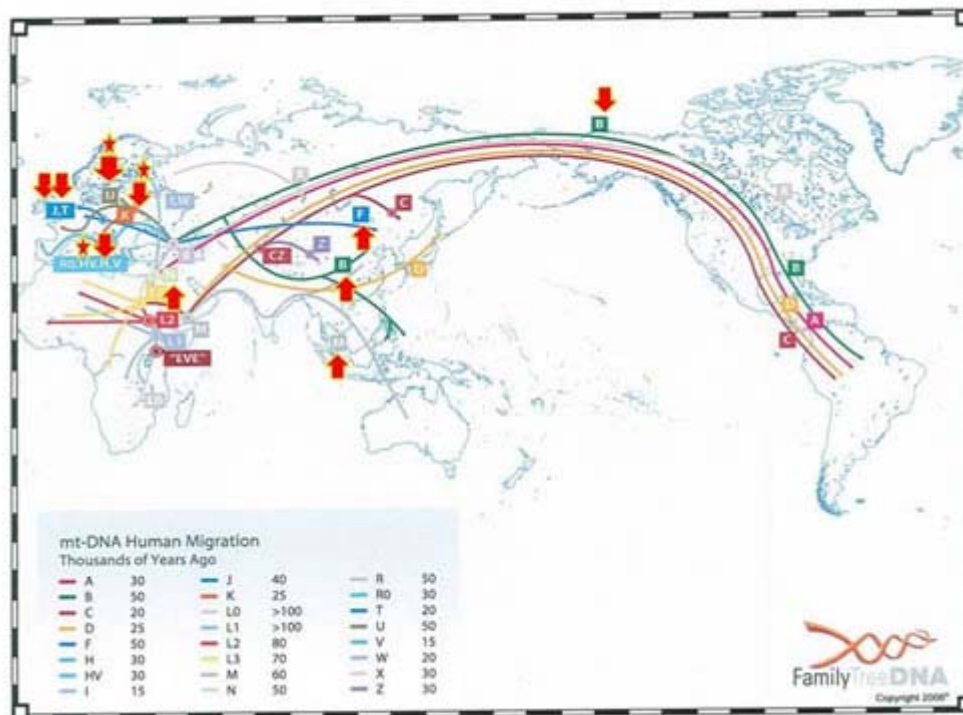


Figure 5: Map showing migration patterns of humans out of Africa according to the most well documented mtDNA haplogroups. The red arrows show which haplogroups were obtained by students in the course. The haplogroups marked with a star, represent the most common haplogroups found by class members. The map is also viewable at www.familytreedna.com

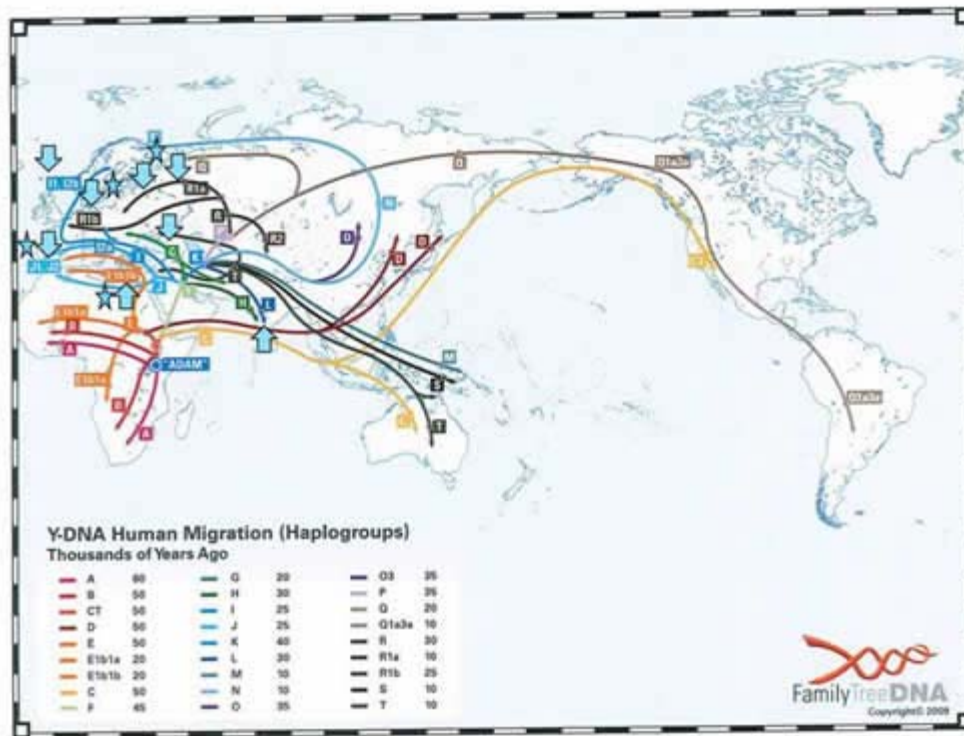


Figure 6: Map showing migration patterns of humans out of Africa according to the most well documented Y-DNA haplogroups. The blue arrows show which haplogroups were obtained by students in the course. The haplogroups marked with a star, represent the most common haplogroups found by class members. The map is also viewable at www.familytreedna.com

Genealogy—Near Ancestry Highlights

Students discovered many genealogical records. In many cases images of documents were obtained that had never been seen before by current family members. Ancestors of two of the course participants arrived to the United States on the same ship, *S.S. Vaderland*, one in 1909 from Hungary, and one in 1913 from Russia (Figure 7). Ship manifests were found detailing ancestors' final destinations as immigrants to the United States and the declared amount of money that they were carrying (Figure 8). Many students were able to obtain U.S. census records documenting the dates, location, and occupation of their ancestors (Figure 9). One student discovered that she was descended from King Edward II of England (20th great-grandfather) and also from William Brewster (12th great-grandfather), who came to North America on the *Mayflower*. In this case, the student was then able to find a [photograph of the tombstone of William Brewster](#), a *Mayflower* passenger (pilgrim) and influential community member in Plymouth, MA. A few students found connections to Indian and other Asian dynasties (dating to the medieval period). One student was able to document a marriage among her direct ancestors between a European settler and a Native American (Figure 10). Another student found an ancestor who had fought (and died) in the French and Indian War in the United States in 1775, and a [photograph of a monument to the Battle of Sideling Hill with the direct ancestor's name inscribed on it](#). In this battle, the Indians captured a private fort owned by

William McCord, where 27 people were killed or captured. The student's direct ancestor was killed in pursuit of Indians at Sideling Hill.

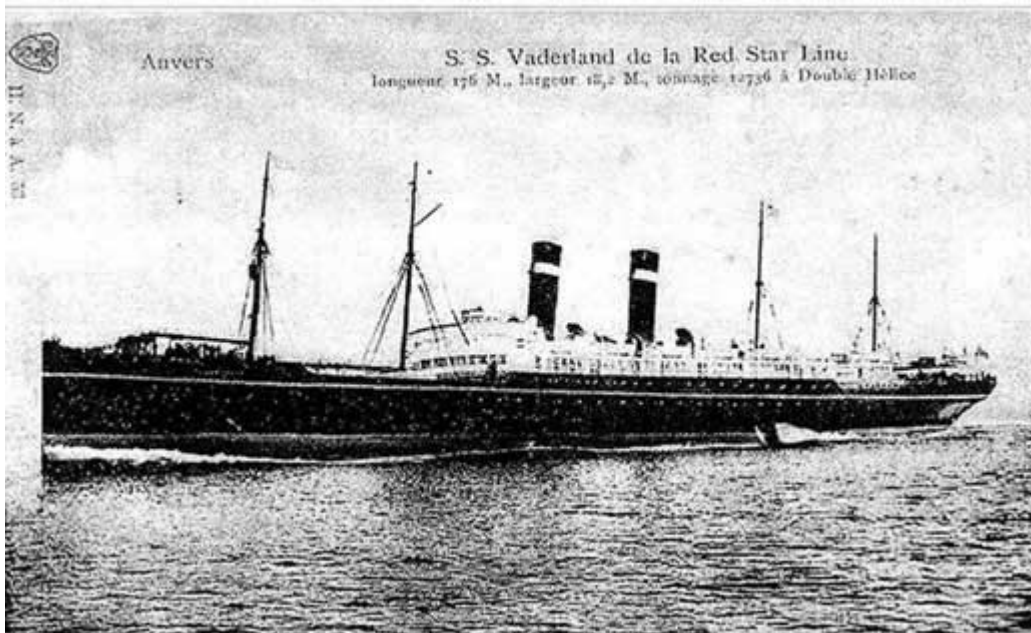


Figure 7: Photo of the S.S. Vaderland of the Red Star link. Ancestors of two students in the class immigrated to the United States via this vessel, in different years. Photo available via a search through the Ancestry Library database available through Nova Southeastern University's genealogy database collection at <http://www.nova.edu/library/electlib/databases.html>

BALDOR, GARR, AND STEERAGE ALIENS MUST BE COMPLETELY MANIFESTED.

3 LIST OR MANIFEST OF ALIEN PASSENGERS FOR THE UNITED STATES

Received by the regulations of the Secretary of Commerce and Labor of the United States, under Act of Congress approved February 20, 1907, to be delivered to the Collector of Customs at the port of arrival.

S. S. VADERLAND sailing from ANTWERP March 22 to 1909

No.	Name of Passenger	Sex	Age	Rank	Profession	Place of Birth	Destination	Remarks
1	Amity	John	28	male	yes	Belgium	Belgium	
2	Adams	John	28	male	yes	Belgium	Belgium	
3	Amity	John	28	male	yes	Belgium	Belgium	
4	Amity	John	28	male	yes	Belgium	Belgium	
5	Amity	John	28	male	yes	Belgium	Belgium	
6	Amity	John	28	male	yes	Belgium	Belgium	
7	Amity	John	28	male	yes	Belgium	Belgium	
8	Amity	John	28	male	yes	Belgium	Belgium	
9	Amity	John	28	male	yes	Belgium	Belgium	
10	Amity	John	28	male	yes	Belgium	Belgium	
11	Amity	John	28	male	yes	Belgium	Belgium	
12	Amity	John	28	male	yes	Belgium	Belgium	
13	Amity	John	28	male	yes	Belgium	Belgium	
14	Amity	John	28	male	yes	Belgium	Belgium	
15	Amity	John	28	male	yes	Belgium	Belgium	
16	Amity	John	28	male	yes	Belgium	Belgium	
17	Amity	John	28	male	yes	Belgium	Belgium	
18	Amity	John	28	male	yes	Belgium	Belgium	
19	Amity	John	28	male	yes	Belgium	Belgium	
20	Amity	John	28	male	yes	Belgium	Belgium	
21	Amity	John	28	male	yes	Belgium	Belgium	
22	Amity	John	28	male	yes	Belgium	Belgium	
23	Amity	John	28	male	yes	Belgium	Belgium	
24	Amity	John	28	male	yes	Belgium	Belgium	
25	Amity	John	28	male	yes	Belgium	Belgium	
26	Amity	John	28	male	yes	Belgium	Belgium	
27	Amity	John	28	male	yes	Belgium	Belgium	
28	Amity	John	28	male	yes	Belgium	Belgium	
29	Amity	John	28	male	yes	Belgium	Belgium	
30	Amity	John	28	male	yes	Belgium	Belgium	

Figure 8: An excerpt from the ship's manifest of a student's ancestor travelling on the Vaderland in 1909. The ancestor's name is highlighted. Image is available via a search through the Ancestry Library database available through Nova Southeastern University's genealogy database collection at <http://www.nova.edu/library/electlib/databases.html>

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SCHEDULE 1—Free Inhabitants in 1st District **in the County of** Polk **State** Iowa
of Polk **enumerated by me, on the** 1st **day of** Sept **1880.** W. H. [unclear]
Post Office Clear Lake

No.	Name	Sex	Age	Color	Profession, Occupation, or Trade of each person, with sex and ability, and its grade of age.	Value in Estate (Dollars)		Place of Birth, showing the State, Territory, or Country.	Whether deaf, dumb, insane, idiotic, pauper, or convict.
						Real Estate	Personal Estate		
1	Samuel [unclear]	M	26	W				Iowa	
2	Charles [unclear]	M	24	W				Iowa	
3	Elizabeth [unclear]	F	22	W				Iowa	
4	William [unclear]	M	16	W	Farmers			Iowa	
5	John [unclear]	M	14	W				Iowa	
6	John [unclear]	M	12	W				Iowa	
7	John [unclear]	M	10	W				Iowa	
8	John [unclear]	M	8	W				Iowa	
9	John [unclear]	M	6	W				Iowa	
10	John [unclear]	M	4	W				Iowa	
11	John [unclear]	M	2	W				Iowa	
12	John [unclear]	M	1	W				Iowa	
13	John [unclear]	M	1	W				Iowa	
14	John [unclear]	M	1	W				Iowa	
15	John [unclear]	M	1	W				Iowa	
16	John [unclear]	M	1	W				Iowa	
17	John [unclear]	M	1	W				Iowa	
18	John [unclear]	M	1	W				Iowa	
19	John [unclear]	M	1	W				Iowa	
20	John [unclear]	M	1	W				Iowa	
21	John [unclear]	M	1	W				Iowa	
22	John [unclear]	M	1	W				Iowa	
23	John [unclear]	M	1	W				Iowa	
24	John [unclear]	M	1	W				Iowa	
25	John [unclear]	M	1	W				Iowa	
26	John [unclear]	M	1	W				Iowa	
27	John [unclear]	M	1	W				Iowa	
28	John [unclear]	M	1	W				Iowa	
29	John [unclear]	M	1	W				Iowa	
30	John [unclear]	M	1	W				Iowa	
31	John [unclear]	M	1	W				Iowa	
32	John [unclear]	M	1	W				Iowa	
33	John [unclear]	M	1	W				Iowa	
34	John [unclear]	M	1	W				Iowa	
35	John [unclear]	M	1	W				Iowa	
36	John [unclear]	M	1	W				Iowa	
37	John [unclear]	M	1	W				Iowa	
38	John [unclear]	M	1	W				Iowa	
39	John [unclear]	M	1	W				Iowa	
40	John [unclear]	M	1	W				Iowa	

Figure 9: An example of a 1880 U.S. census record of a class participant’s ancestors. The family of the direct ancestor is enclosed in a green box. Image is available via a search through the Ancestry Library database available through Nova Southeastern University’s genealogy database collection at <http://www.nova.edu/library/electlib/databases.html>



Figure 10: Photo of married couple who were ancestors of a class member showing marriages between European settlers and Native Americans. This image dates from the middle to late 1800s. Photo provided courtesy of a class member's family collection.

Many of the students discovered they had ancestors who immigrated to the United States during the late 1800s from Europe, including countries such as Poland (Figure 11) and Wales (Figure 12). Another student learned that a direct ancestor was recruited and served as “Hitler Youth” (Figure 13), while a classmate’s Jewish ancestor posed as a Catholic nun during World War II and finally escaped Europe for the United States with her daughter (Figure 14). Students were also able to find United States government draft documents for World War I and II. Often these documents provided student’s families with the only record of an ancestor’s signature (Figures 15 and 16). In one case, a student was able unambiguously to document the sibling relationship between her direct ancestor, Clementina, who had been adopted in the 1800s and her brother, Leonardo Covello, a more widely known Italian-American educator and author (Figures 17a and b). In some cases students found ancestral adoptions, when they had not known of them before. Students were also able to locate images of ancestors’ marriage licenses (Figure 18), and in some cases even learned that their parents had not been married as long as they had thought. Other students discovered that ancestors had merely taken on a royal lineage surname with little likelihood of actually being descended from that ancestral line at the time of the Muslim invasion of India.



Figure 11: Photo of a student's direct ancestors who left Poland to immigrate into the U.S. in the late 1880s. Photo provided courtesy of a class member's family collection.



Figure 12: Photo of a student's direct ancestors who left Wales to immigrate into the U.S. in the late 1880s. Photo provided courtesy of a class member's family collection.



Figure 13: Photo of a student's direct ancestor who was part of the "Hitler Youth" program during World War II. Photo provided courtesy of a class member's family collection.



Figure 14: Photo of a student's direct ancestor who was Jewish but posed as a Catholic nun to avoid persecution during World War II. Photo provided courtesy of a class member's family collection.

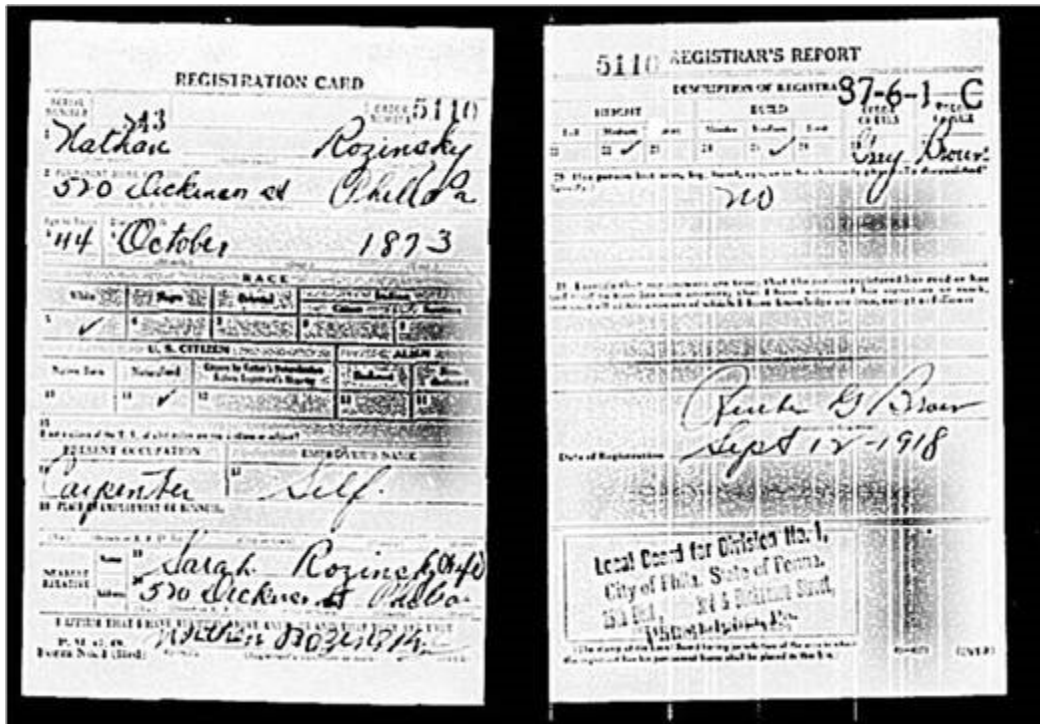


Figure 15: An example of the World War I draft card of a class participant’s direct ancestor. Image is available via a search through the Ancestry Library database within Nova Southeastern University’s genealogy database collection at <http://www.nova.edu/library/electlib/databases.html>

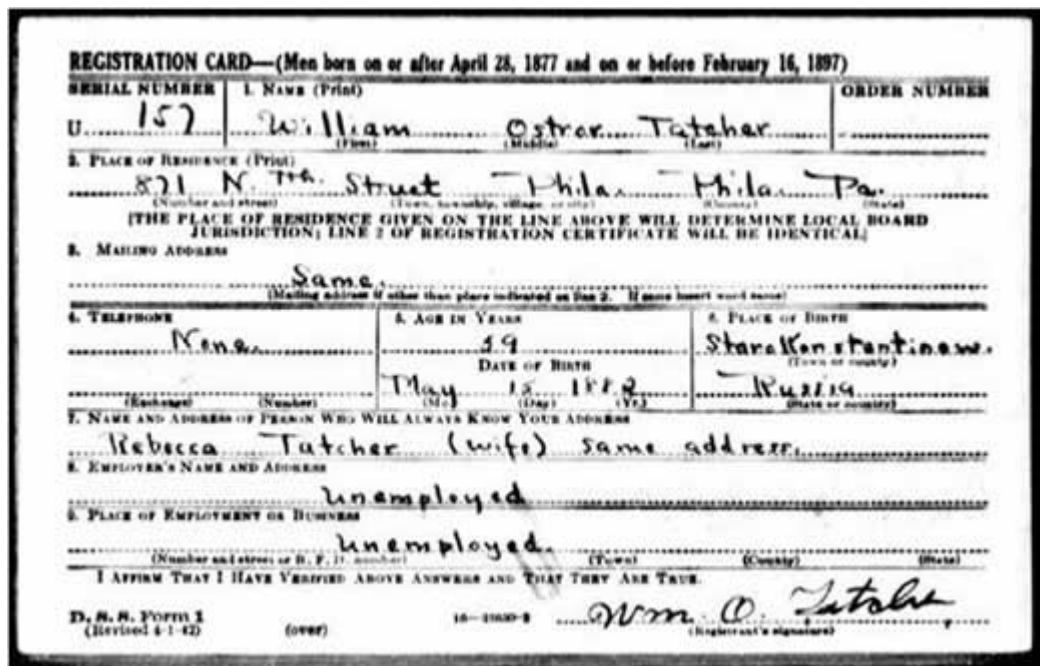


Figure 16: An example of the World War II draft card of a class participant’s direct ancestor. Image is available via a search through the Ancestry Library database within Nova Southeastern University’s genealogy database collection at <http://www.nova.edu/library/electlib/databases.html>

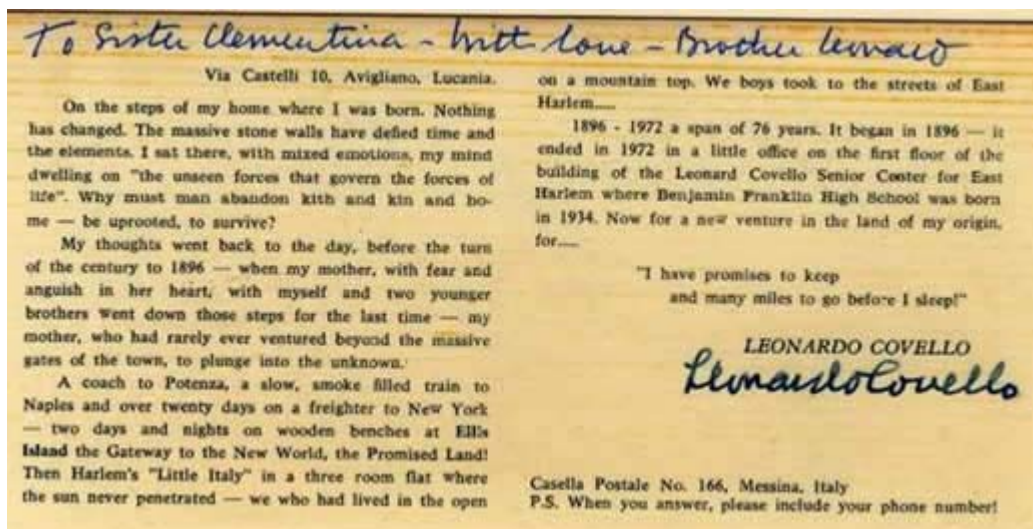


Figure 17a: Letter written to the sister of a student's direct ancestor by her brother. The note documents the relationship between the Italian American educator and author, Leonardo Covello and his lesser known sister, Clementina, who was the student's direct ancestor. Image provided courtesy of a class member's family collection.



Figure 17b: Photo (circa 1880) of Clementina, the sister of Leonardo Covello. Photo provided courtesy of a class member's family collection.



Figure 18: An example of a marriage license of a student’s direct ancestors from 1912. Image is available via a search at <http://www.familysearch.org>

Regarding these results, most of the students were not particularly surprised, since they generally fit into expectations based on their knowledge of presumed family origins. For example, one student wrote: “After collecting both my mitochondrial DNA and Y-chromosome DNA and sending it out for testing it was discovered that my mitochondrial DNA belongs to haplogroup N1 or to be more specific subclade N1*. My y-chromosome DNA belongs to haplogroup R1a1. Both these haplogroups are found in Asia. The information collected from the genetic analysis paralleled with the information obtained from oral stories and historical records.”

However, another student wrote: “I am approximately eighty-five percent German, so I predicted I would belong to two common European Haplogroups; Haplogroup H and Haplogroup R1A1. To determine my maternal and paternal haplogroups, my mitochondrial and my father’s Y chromosomal DNA was analyzed to detect genetic mutations or markers that would be used to classify the DNA into a particular haplogroup. Not surprisingly the marker within my mitochondrial DNA was characteristic of Haplogroup H, meaning my ancestors migrated into Europe around 15,000 years ago after the last ice age. However, my father’s Y chromosomal DNA showed he belonged to Haplogroup G, which shows a migration pattern from Africa to the Himalayan Foothills.”

A third student indicated: “My mitochondrial DNA came up as J*, which was shocking because I expected to be in haplogroup K. Not surprisingly, my dad’s mitochondrial DNA result was

haplogroup K and his Y-chromosome was R1a. These findings were unsurprising since I have been raised as an Ashkenazi Jew and it is known that my dad's family originally came from Europe.”

Another student summarized that, “Overall, I have made a significant amount of progress in the determination of my family history considering how little I knew to begin with. I believe that I have the experience and knowledge to continue searching for my relatives on my own and will continue to do so. In the future, I am going to attempt to contact my family in Italy with the help of my Aunt Mary.”

One student commented on an interesting find: “I was surprised to learn that my genetic tests showed a high likelihood of Ashkenazi Jewish heritage from my Hungarian relatives. As far as anyone in my family knows, none of us were ever Jewish.”

Conclusions and Applications

This course collaboration has proven to be a very interesting and popular one for the students and professors involved. All participants in this course were able to make closer personal connections to historical events by being able accurately to connect with ancestors that were involved in these major historical events. Each student was presented with particular challenges. Some students had adoptions in the family, or did not know the male ancestors at some point in their lineage, due to being raised only by a maternal ancestor and an adopted father. Students found that it was generally easier to find historical records for ancestors living in the United States, compared to other countries. Students were able to trace their ancestral lines a different number of generations, from only a few generations to upwards of 15 generations, as far back as 16th- century England. How far the students could trace their ancestry depended on their specific details, if their lineages could be documented to relate directly to a well-known and documented family line, and how detailed their personal family records were. If one's ancestry intersects an icon of history, there is a wealth of published information and it becomes much easier to extend one's knowledge of his or her historical ancestry.

As we journeyed through the course readings and the development of our personal family history narratives, we realized that we are all more alike than different and that our ancestors were greatly affected by the current events of their time. Specifically, many of our ancestors were immigrants from Europe during the late 19th and early 20th century: two of the course members' ancestors were even passengers on the same ship at different times. Additionally, students' cultural sensitivities were heightened by learning such details as, while one class member's ancestor was involved in the “Hitler Youth” program, another's was fearing for her life and hiding as a Catholic nun to conceal her Jewish identity. It can be hard to think that one of our group's ancestors might have been inflicting pain or prejudice on the ancestor of another student in the class, but that is a likely situation, as our ancestry reflects the actions and attitudes of various elements of humanity throughout time. All of the students walked away from the course with an increased knowledge of their ancestors and a strong desire to learn more. In addition to the well-established database searches, some students even found distant relatives via social media such as Facebook. In one case, a student found a distant relative with a treasure trove of genealogical information on a common direct ancestor (Bromberg, 2010). Overall, it was fascinating to see the search for one's ancestors become an all-consuming project for many of

the participants. It is certain that many of the students will continue in a life-long pursuit of documenting their family lineages.

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Additional Genetics and Genealogy Resources

A few relevant films:

- The Family Who Walks on All Fours
<http://www.pbs.org/wgbh/nova/allfours/>
- Becoming Human
<http://www.becominghuman.org/>
- The Human Spark
<http://www.pbs.org/wnet/humanspark/>
- The Story of India
<http://www.pbs.org/thestoryofindia/>
- Journey of Man
<http://www.shoppbs.org/product/index.jsp?productId=1402989>

A few helpful Web sites:

- Dolan DNA Learning Center
<http://www.dnalc.org/>
- Genetic Origins on Dolan DNA Learning Center's site:
<http://www.geneticorigins.org/>
- Human Genographic Project
<https://genographic.nationalgeographic.com/genographic/index.html>
- NSU Library Genealogy Reference Pages
<http://sherman.library.nova.edu/genealogy/>
- Family Search
<http://www.familysearch.org/eng/default.asp>
- DNA Heritage
<http://www.dnaheritage.com>

A few helpful Web sites that offer genealogy software (some free versions):

- Legacy Family Tree
<http://www.legacyfamilytree.com/>
- My Heritage
www.myheritage.com