

Society and Genetics 120: Genetics and Human History

Quarter: Winter 2016

Location: Haines A25 / Dodd 154

Time: MW 9:30-10:45 AM

Instructor: Dr. Erik Gjesfeld

Office: Life Sciences 3323A

Office Hours: M & W 10:45-11:45
(Or by Appointment)

Course Website: <https://ccle.ucla.edu/course/view/16W-SOCGEN120-1>

Course Description: Advancements in genomic research have rapidly transformed traditional archaeological and historical investigation of the human past. Drawing from recent research, this course will focus on how genetic analysis has shed new light on old debates such as the migration of *Homo sapiens* out of Africa, our relationship with Neanderthals, the first population movement to North America, ethnic expansions in Europe and Africa. This course will also include discussion of the practical and theoretical issues surrounding genetic research of past humans including the challenges of using ancient and modern DNA, population genetic theory and the ethical implications of genetic research for understanding ethnicity. A basic understanding of genetics is expected but no prior knowledge of human history is necessary.

Course Objectives

- 1) Outline the course of human evolution and understand how genomic studies have contributed to the current understanding of our shared past
- 2) Describe the theoretical, methodological and ethical challenges surrounding the application of genomic research to human history
- 3) Synthesize how genomic research has changed archaeological and historical accounts of the past and the potential for genomic research in future historical research

Course Readings: There is no textbook for this course with most assigned readings coming from journal articles. Journal articles will primarily be academic articles and will often require careful and critical reading. All articles will be available on the course website.

Course Structure: This course meets twice a week on Monday and Wednesday mornings for 75 minutes per session. For your benefit and mine, I will not be lecturing all the time. Instead, I will rely on classroom discussion in order to explore key course concepts.

Course Assessment:

Presentation (January 20)	50 points	(10%)
Mid-Term Essay (February 8)	100 points	(20%)
Poster Project (March 11)	150 points	(30%)
Final Essay (March 18)	80 points	(16%)
Class Participation	120 points	(24%)
	500 points	

Percentage	Points	Letter Grade	GPA Value
92.0-100	460-500	A	4.0
89.0-91.9	445-459	A-	3.7
86.0-88.9	430-444	B+	3.3
83.0-85.9	415-429	B	3.0
80.0-82.9	400-414	B-	2.7
77.0-79.9	385-399	C+	2.3
74.0-76.9	370-384	C	2.0
71.0-73.9	355-369	C-	1.7
68.0-70.9	340-354	D+	1.3
65.0-67.9	325-339	D	1.0
62.0-64.9	310-324	D-	0.7
<62.0	0-309	F	0.0

Student Presentation: In the third week of the course, groups of students will be asked to present a 15-20 minute review of a key course concept and discuss how the concept is used to understand the genetic origins and dispersal of *Homo sapiens*. Students may or may not use powerpoint, keynote or other slides for this presentation. I will provide a series of questions that you help guide the review and presentation of your concept.

Mid-Term Essay: Students will write an opinion essay between 1,200 and 1,500 words that examines the following question: **how does ancestral past influence our present? Or does it?** This essay should explore this question through review of readings assigned in class as well as additional literature that are researched by the student. The essay should be written in proper scientific format with citations in style consistent with the own discipline. Further details about the essay will be provided in Week Two of the quarter.

Poster Project: Students will form groups of two (or work individually) and design a research project that examines a historical or archaeological question using genetic methods. Students are encouraged to choose a research topic not covered in our course, but projects related to course material are allowed if approved by the instructor. This poster will be presented to the class in a conference style format on the last day of the course. Groups should be formed by week 6 in order for students to have sufficient time to prepare the poster. It is highly advisable to develop poster project in consultation with

Erik, which can be done at any time during the course. Students will be expected to review all other posters and provide constructive feedback on all aspects of the presented posters.

Final Essay: Students will write an essay of between 500 and 750 words that explores how different modern human society might be had history taken a different course. This essay should choose a single point in human history and specifically explore how the genetic makeup of either all humans or a select group of humans would be different had history been different. This essay does not need to be written in a scientific format but drawing on credible scientific evidence and concepts is necessary to achieve a higher grade. You are more than welcome to build from your poster project research topic for this essay. Further details about the paper will be discussed in Week 7 of the course.

Class Participation: During the discussion of assigned readings and lecture concepts, students are expected to be active participants in class discussion. This will include verbal and written responses to discussion questions, verbal discussion of readings, written in-class activities and even unscheduled “pop” quizzes. Twelve class sessions will have a participation assignment due, each being worth 10 points for a total of 120 points.

Course Policies

Class Participation: This is a course that will rely heavily on class participation. Your opinions, questions and commentary are always welcome as long as your opinions respect other students in the course and myself. I will not tolerate any disrespectful comments towards students or instructors.

Missed and late assignments/exams: Given the structure of assignments in this course, no late work is accepted without approval from Erik. If circumstances arise in which you are unable to turn in an assignment and you if have a justifiable reason, please talk to me as soon as possible.

Absences: Your attendance and class participation is critical to your success in this class. In-class activities and discussions during lecture will help to prepare you to write good essays. If you need to miss class for any reason please contact Erik as soon as possible to make arrangements.

Student Disabilities: Students needing an academic accommodation based on a disability should contact the Office for Students with Disabilities (OSD) located at (310) 825-1501 or A255 Murphy Hall. When possible, students should contact the OSD within the first two weeks of the term as reasonable notice is needed to coordinate accommodations. For more information visit www.osd.ucla.edu.

Erik reserves the right to change any assignments, grading and policies outlined in the syllabus during the course. Finally, **the most important policy of this class is that if you don't know something, please ASK!!**

Course Schedule

Week 1: Introduction to Course and The Emergence of Us

Monday, January 4		Wednesday, January 6	
<i>Lecture Topics</i>	<i>Readings / Assignments</i>	<i>Diss. Topics</i>	<i>Readings / Assignments</i>
Introduction Syllabus review	None	The Emergence of Us	Wade – Before the Dawn Chapter 2

Week 2: What Makes us Human?

Monday, January 11		Wednesday January 13	
<i>Lecture Topics</i>	<i>Readings / Assignments</i>	<i>Diss. Topics</i>	<i>Readings / Assignments</i>
The Genetics of Humanness	Pollard 2009 Wade – A Troublesome Inheritance, Chapter 3	Out of Africa: Archaeology & Fossils	Klein 2009 Stringer 2014

Week 3: Key Genetic Concepts

Monday, January 18		Wednesday January 20	
<i>Lecture Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
NO CLASS	MLK Day of Service	Key Genetic Concepts Out of Africa: Genetics	Group Presentation

Week 4: Neanderthals

Monday, January 25		Wednesday January 27	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Neandethals: Intro	Hublin 2009	Neanderthals: Europe	Green et al. 2010 Fu et al. 2015

Week 5: Neanderthals (continued)

Monday, February 1		Wednesday February 3	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Neanderthals: Asia	Reich et al. 2010 (#1) Prufer et al. 2014 (#2) Meyer et al. 2014 (#3) Fu et al. 2013 (#4) Zimmer 2015 (All)	The fate of Neanderthals and their lasting impact	Hawks 2013 Bower 2014

Week 6: Migration across the Pacific

Monday, February 8		Wednesday February 10	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Australia	Mid-Term Paper Due!	Americas	Raghavan et al. 2015 Raff and Bonick 2014

Week 7: Kennewick Man

Monday, February 15		Wednesday February 17	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
NO CLASS	President's Day	Kennewick Man	Meltzer 2015

Week 8: Migration in Europe

Monday, February 22		Wednesday February 24	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Europe	Pinhasi et al. 2012	Genetics of food and domestication	Zeder et al. 2006

Week 9: Ethnic Expansions and the Genetics of Race

Monday, February 29		Wednesday, March 2	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Thule Numic Polynesia Brits	Raghavan et al. 2014 (#1) Kaestle & Smith 2001 (#2) Kayser et al. 2010 (#3) Winney et al. 2012 (#4)	The Genetics of Race	Wade, A Troublesome Inheritance, Chapter 5

Week 10: Course Review and Posters

Monday, March 7		Wednesday, March 9	
<i>Diss. Topics</i>	<i>Readings / Assignments</i>	<i>Lecture Topic</i>	<i>Readings / Assignments</i>
Course Wrap-Up Future of Genetics	None	Poster Presentations	Poster Projects Due!!

Final Exam: Final essays are due by March 18th at 11 am. These essays can be turned in through the course website or emailed to Erik.

Reading List

Week 1

Wade, Nicholas 2006. *Before the Dawn: Recovering the Lost History of Our Ancestors*. New York: Penguin Press. Chapter 2, pages 12-35.

Week 2

Pollard, Katherine 2009. "What Makes Us Human?". *Scientific American* 300 (5): 44-49

Wade, Nicholas. 2014. *A Troublesome Inheritance: Genes, Race and Human History*. Second Printing edition. New York: Penguin Press. Chapter 3, pages 39-66.

Klein, Richard 2009. "Darwin and the recent African origin of modern humans". *Proceedings of the National Academy of Sciences* 106 (38): 16007-16009

Stringer, Chris. 2014. "Why We Are Not All Multiregionalists Now." *Trends in Ecology & Evolution* 29 (5): 248–51.

Week 3 (Choose article based on your genetic concept questions)

Cann, Rebecca, Mark Stoneking, and Allen Wilson 1987. "Mitochondrial DNA and Human Evolution." *Nature* 325: 31–36.

Hodgson Jason and Todd Disotell 2010. "Anthropological Genetics: Inferring the History of Our Species Through the Analysis of DNA". *Evolution Education and Outreach* 3: 387-398

Tishkoff, Sarah and Scott Williams 2002. "Genetic Analysis of African Populations: Human Evolution and Complex Disease". *Nature Review Genetics* 3: 611-621

Ingman, Max, Henrik Kaessmann, Svante Paabo & Ulf Gyllensten 2000. "Mitochondrial genome variation and the origin of modern humans" *Nature* 408: 708-713

Week 4

Hublin, J.J. 2009 "The origin of Neandertals". *Proceedings of the National Academy of Sciences* 106 (38): 16022-16027

Green, Richard, et al. 2010. "A Draft Sequence of the Neandertal Genome." *Science* 328 (5979): 710–22.

Fu, Qiaomei, et al. 2015. "An early modern human from Romania with a recent Neanderthal ancestor" *Nature* 524: 216-219

Week 5

Reich, David, et al. 2010. "Genetic History of an Archaic Hominin Group from Denisova Cave in Siberia." *Nature* 468 (7327): 1053–60.

Prufer, Kay, et al. 2014 "The complete genome sequence of a Neanderthal from the Altai Mountains". *Nature* 505: 43-49

Meyer, Matthias et al. 2014 "A mitochondrial sequence of a hominin from Sima de los Huesos". *Nature* 505: 403-406

Fu, Qiaomei et al. 2013. "DNA Analysis of an early modern human from Tianyuan Cave, China". *Proceedings of the National Academy of Sciences* 110 (6): 2223-2227.

Zimmer, Carl 2015. "A New Theory on How Neanderthal DNA Spread in Asia". *New York Times*, February 19, 2015.

Hawks, Jonathan 2013. "Significance of Neanderthal and Denisovan Genomes in Human Evolution". *Annual Review of Anthropology* 42: 433-449

Bower, Bruce 2014. "Neanderthal hot spots highlighted in modern humans' DNA". *ScienceNews*, March 8, 2014.

Week 6

Raghavan, Maanasa, et al. 2015. "Genomic evidence for the Pleistocene and recent population history of Native Americans". *Science* 349 (6250): aab3884-1-aab3884-7.

Raff, Jennifer and Deborah Bolnick 2014. "Genetic Roots of the First Americans". *Nature* 506: 162-163

Week 7

Meltzer, David 2015. "Kennewick Man: Coming to Closure". *Antiquity* 89 (348): 1485-1493

Week 8

Pinhasi, Ron, et al. 2012. "The Genetic History of Europeans". *Trends in Genetics* 28 (10): 496-505.

Zeder, Melinda et al. 2006. "Documenting Domestication: the intersection of genetics and archaeology". *Trends in Genetics* 22 (3): 139-155.

Week 9

Raghavan, Maanasa, et al., 2014. "The genetic prehistory of the New World Arctic". *Science* 345 (6200): I255832-1-I255832-9

Kaestle, Frederika A., and David Glenn Smith. 2001. "Ancient Mitochondrial DNA Evidence for Prehistoric Population Movement: The Numic Expansion." *American Journal of Physical Anthropology* 115 (1): 1–12.

Kayser, Manfred. 2010. "The Human Genetic History of Oceania: Near and Remote Views of Dispersal." *Current Biology* 20 (4): R194–R201.

Winney, Bruce, et al., 2012. "People of the British Isles: preliminary analysis of genotypes and surnames in a UK-control population". *European Journal of Human Genetics* 20: 203-210.

Wade, Nicholas. 2014. *A Troublesome Inheritance: Genes, Race and Human History*. Second Printing edition. New York: Penguin Press. Chapter 5, pages 95-122.

Week 10

None