

# **Anthropology 3211/5211-090 (Online)**

## **Biology of Native Americans**

### **Spring Semester 2019**

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Anthropology 3211 is designed to give the student an overview of what is currently known about the biological makeup of both ancient and modern Native Americans. North and South America were among the last major land-masses colonized by fully modern humans. Although considerable debate exists, Native Americans are not thought to have reached the interior of North America until approximately 30,000 years ago--at the earliest; not until 12,000 years ago at the latest. This relatively recent colonization event is still evident in the patterning of biological diversity of modern Native Americans, and Anthropology 3211 will explore this relationship in detail.

The course begins with a primer in molecular biology, including the study of genes, chromosomes, proteins and mutation, with a focus on the understanding of modern genetic markers such as restriction site polymorphism (RSP) and single nucleotide polymorphism (SNPs) within the Native American genome. Microevolutionary forces are covered with a focus on their potential role in patterning Native American biological variation.

Before the advent of modern genetic data, anthropologists commonly used morphological measurements to reveal biological diversity. For this reason, basic physiological adaptation, such as adjustment to high altitude conditions and variation in cranial morphology are covered. Another major aspect of biological diversity is seen in examination of Native American health. Pre and Proto-historic disease vectors are considered.

DNA sequence data is perhaps the most powerful tool that biologists have ever had to reveal and measure biological diversity. DNA sequence data can also reveal population history, and estimate the timing of major evolutionary events, such as migration, and population sub-division. The course provides as its last section a consideration of both ancient and modern DNA evidence to assess general patterns and conclusions regarding the biology of Native Americans.

### **Required Text**

There is no required text for this course. All required readings are on electronic reserve through the Marriott Library.

## **Course Learning Outcomes**

Anthropology 3211/5211 will directly address the Learning Outcomes determined by the Department of Anthropology through the following means:

**1) Students will describe and explain aspects of biological variation among Native American populations by:**

**Understanding the four forces of microevolution, and assessing how they can potentially cause populations to evolve and accumulate biological differences.**

**Assessing the traditional types of biological data collected in the 19<sup>th</sup> and 20<sup>th</sup> centuries to explain Native American biological variation, including craniometrics, high-altitude adaptation, and the ABo blood-group system.**

**2) Students will apply anthropological research methods to answer basic questions about the colonization of the New World and the relationships between ancient and modern Native peoples through:**

**Understanding the process of Native American colonization of the New World with a specific focus on how such colonization ultimately patterned modern Native American biological variability.**

**Understanding the basic difference between mtDNA, nDNA, and YDNA, and how each molecule can be used to assess modern biological variability.**

**Understanding the basic methodologies of ancient DNA (aDNA) studies of Native peoples and how this data can be compared to modern DNA studies to reveal the underlying biological relationships between ancient and modern peoples that may have been obscured by evolutionary forces such as genetic drift and migration, as well as specific culture-histories.**

## Grading

Students will be tested on assigned class readings, lectures (including powerpoints), and movies. Your grade will be determined by three midterms (100 points each), and ten weekly quizzes (100 point total), for a total of 400 points. **Extra-credit work will not be accepted (aside from the optional writing assignment (see below)).** The final grading scale will follow the standard University of Utah format:

100-93%	A	79-77%	C+
92-90%	A-	76-73%	C
89-87%	B+	72-70%	C-
86-83%	B	69-67%	D+
82-80%	B-	66-63%	D
		62-60%	D-
		<60%	E

## Exam Details and Schedule (CANVAS)

Exams in this class come in two forms, weekly quizzes, and three midterm exams. Students should confirm that they will be available to take the three midterm exams and ten weekly quizzes within their required time-frames—as *I cannot guarantee testing arrangements outside of their given days/weeks.*

**Both the weekly and midterm exams will be taken through the CANVAS portal, and can be taken at home, on your own computer. All exams and quizzes are open-notes, open-articles, etc...—but students are expected to do their own work.**

**Midterm Exams.** Midterms exams will open on their respective Mondays, and end the following Saturday—so the student will have six full days to take midterm exams through CANVAS:

1st Midterm	Feb. 4, 5, 6, 7, 8, and 9th (Saturday)
2nd Midterm	March 18, 19, 20, 21, 22, and 23rd (Saturday)
3 <sup>rd</sup> Midterm	April 22, 23, 24, 25, 26, and 27th (Saturday)

**Weekly Quizzes.** There will be ten open-book weekly quizzes (the first weekly quiz is a practice quiz), and the student must take all ten of them (through CANVAS). *If the student takes all ten weekly quizzes and the practice quiz, I will count the ten highest scores.* Weekly quizzes are designed to test your knowledge of the assigned material for the previous week—and as such, weekly quizzes will be open between Fridays and Mondays (four days).

Weekly quizzes are short exams that are worth 10 points each. The weekly quizzes are open-book, open-notes, open-internet. The exams are designed to test/refresh your knowledge of the assigned readings, so if the student has done the readings, the weekly quizzes should be straight-forward. There will be no weekly exams after midterm weeks, or during Spring break week.

<b>Weekly Quiz</b>	<b>Subject Week</b>	<b>Dates Open</b>
PRACTICE	ONE	Jan. 11-14
ONE	TWO	Jan 18-21
TWO	THREE	Jan 25-28
THREE	FOUR	Feb 1-4
END SECTION ONE		

<b>Weekly Quiz</b>	<b>Week</b>	<b>Dates Open</b>
FOUR	SIX	Feb 15-18
FIVE	SEVEN	Feb 22-25
SIX	EIGHT	Mar 1-4
SEVEN	NINE	Mar 6*-11 opens early
END SECTION TWO		

<b>Weekly Quiz</b>	<b>Week</b>	<b>Dates Open</b>
SPRING BREAK	TEN	SPRING BREAK
EIGHT	TWELVE	Mar 29-Apr 1
NINE	THIRTEEN	Apr 5-8
TEN	FOURTEEN	Apr 12-15
END SECTION THREE		

### **Holidays/Breaks**

Martin Luther King	January 14	No Office Hours
President's Day	February 18	No Office Hours
Spring Break	March 11-15	No Office Hours

### **Optional Essay Paper**

Towards the middle of the course, the professor will provide several (optional) challenge essay questions. Students will be given several different subjects to choose from. If the student desires, he or she can turn in an essay paper. The grade on the essay paper will replace the lowest-scored midterm of the student. The essay must be typed and printed. Faxed copies will not be accepted. **More details will be released on this optional paper.**

### **Student and Faculty Code**

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content.

## Weekly Subjects

<b>Week</b>	<b>Subject</b>
1/2	Basic Molecular Biology and Microevolution
2/3	Introduction to Traditional Genetic Markers/Systems
3	High Altitude Adaptation
4	Craniometrics: The Study of Cranial Variation and Race
5	<b>First Midterm: Open on CANVAS: Mon Feb 4-Sat Feb 9</b>
<b>END SECTION ONE</b>	
6/7	The Colonization of the “New World”
7/8	Paleoindian Skeletal Evidence (Focus On: Kennewick Man)
9	The DNA Evidence: What do the Genes say about Colonization?
11	<b>Second Midterm: Open on CANVAS: Mon March 18-Sat March 23</b>
<b>END SECTION TWO</b>	
12/13	Colonization and Native Mortality and Disease (A New World Syndrome?)
14	Ancient DNA Studies: Prehistory of the US Southwest: Ancestral & Modern Puebloans: Genetic Relationships
15	Ancient DNA Studies: The “Mystery” of Easter Island
16	<b>Third Midterm: Open on CANVAS: Mon April 22-Sat April 27</b>
<b>END SECTION THREE</b>	

**Required Readings: Anthropology 3211  
Electronic Reserve (Marriot Library)  
There is a link to your course reserves within the  
CANVAS site.**

**Weeks 1-2 (January 7<sup>th</sup>-January 18<sup>th</sup>)**

**Basic Molecular Biology and General Introduction**

Davis, DS. 2004. Genetics: The not-so-new thing. *Perspec. Biol. & Med.* 47(3):430-440.

Cavalli-Sforza LL and F Cavalli-Sforza. 1995. How different are we? The genetic history of the human species. *In The Great Human Diasporas: The History of Diversity and Evolution*, pp. 106-125. Addison-Wesley Publishing Company, Reading.

**Week 3 (January 21<sup>st</sup>-January 25<sup>th</sup>)**

**Adaptation to High Altitude Conditions**

Beall CM. 2000. Tibetan and Andean patterns of adaptation to high-altitude hypoxia. *Hum. Biol.* 72:201-228.

Crawford, JE, R Amaru, J Song, CG Julian, et al. 2017. Natural selection on genes related to cardiovascular health in high-altitude adapted Andeans. *Am J. Hum. Genet.* 101: 752-767.

Lindo, John, et al. 2018. The genetic prehistory of the Andean Highlands, 7000 yBP through European contact. *Science Advances* 2018 (4): eaau4921.

**Week 4 (January 28<sup>th</sup>-February 1<sup>st</sup>)**

**Craniometrics: The Study of Cranial Variation & “Race”**

Jantz RL and DW Owsley. 2001. Variation among early North American crania. *Am. J. Phys. Anthr.* 114:146-155.

Adovasio, James M. 2002. Chapter One: Glimpses Through the Looking Glass. *In The First Americans, In Pursuit of Archaeology's Greatest Mysteries*, pp. 3-32. Modern Library/Random House.

**END SECTION ONE (Exam One: Feb. 4-9<sup>th</sup>)**

**BEGIN SECTION TWO**

**Weeks 6/7 (February 11<sup>th</sup>-February 22<sup>nd</sup>)**

**Colonization of the New World**

Dillehay, Thomas. 2000. Chapter Nine: Migration, Adaptation, and Diversity. *In The Settlement of the Americas: A New Prehistory*, pp. 249-262. New York: Basic Books.

Goebel, T, MR Waters and DH O'Rourke. 2008. The Late Pleistocene dispersal of modern humans in the Americas. *Science* 319: 1497-1502.

Fix, Alan G. 2002. Colonization models and initial genetic diversity in the Americas. *Hum. Biol.* 74(1):1-10.

## **Week 8 (February 25<sup>th</sup>-March 1<sup>st</sup>)**

### **Paleoindian Skeletal Evidence (Focus: Kennewick Man)**

Chatters, James C. 2000. The recovery and first analysis of an Early Holocene human skeleton from Kennewick, Washington. *Am. Antiq.* 65(2):291-316.

Owsley, Douglas M. et. al. 2014. Chapter Seven: Skeletal inventory, morphology, and pathology. In (Owsley DW and R Jantz, eds.) The Scientific Investigation of an Ancient Skeleton, pp. 139-186. Ebooks Corp 2014. **(Note: This is an E-Book, and it can be accessed directly/electronically checked out directly from the Marriott Library)**

Rasmussen, M. et al. 2015. The ancestry and affiliations of Kennewick Man. *Nature* (doi: 10.1038/nature 14625).

## **Week 9 (March 4<sup>th</sup>-March 8<sup>th</sup>)**

### **What Do the Genes Say About Colonization?**

Zegura SL, TM Karafet, LA Zhivotovsky and MF Hammer. 2004. High-resolution SNPs and microsatellite haplotypes point to a single, recent entry of Native American Y chromosomes into the Americas. *Mol. Biol. Evol.* 21(1):164-175.

Fagundes, NJR, et. al. 2008. Mitochondrial population genomics supports a single pre-Clovis origin with a coastal route for the peopling of the Americas. *Am. J. Hum. Genet.* 82: 583-592.

Moreno-Mayar, J. Victor, et al. 2018a. Terminal Pleistocene Alaskan genome reveals first founding population of Native Americans. *Nature* 553: 203-207.

Moreno-Mayar, J. Victor, et al. 2018b. Early human dispersals within the Americas. *Science* 10.1126/science.aav2621.

## **END SECTION TWO (Exam Two: March 18-23)**

## **BEGIN SECTION THREE**

### **Weeks 12/13 (March 25<sup>th</sup>-April 5<sup>th</sup>)**

#### **Pre and Proto-Historical Patterns of Disease**

Thornton, RL. 1987. Three hundred years of decline: 1500 to 1800. *In American Indian Holocaust and Survival: A Population History since 1492*, pp. 60-90. University of Oklahoma Press, Norman.

Erikson, RP. 2009. Autosomal recessive diseases among the Athabaskans of the Southwestern United States: Recent advances and implications for the future. *Am. J. Med. Genet. Part A* 149A:2602-2611.

Ritenbaugh, C and CS Goodby. 1989. Beyond the thrifty gene: Metabolic implications of prehistoric migration into the New World. *Med. Anth.* 11: 227-236.

Kraemer, KH, MM Lee and J Scotto. 1987. *Xeroderma Pigmentosum*. *Arch. Dermatol.* 123: 241-150.

### **Week 14 (April 8<sup>th</sup>-April 12<sup>th</sup>)**

#### **Ancient and Modern DNA Studies: Puebloan Peoples**

Raff, JA, DA Bolnick, J Tackney, and DH O'Rourke. 2011. Ancient DNA perspectives on American colonization and population history. *Am. J. Phys. Anth.* 146: 503-514.

Snow, MH, KR Durand, and DG Smith. 2010. Ancestral Puebloan mtDNA in context of the greater Southwest. *J. Arch. Sci.* 37: 1635-1645.

### **Week 15 (April 15<sup>th</sup>-April 19<sup>th</sup>)**

#### **Ancient and Modern DNA Studies: The Mysteries of Easter Island**

Fehren-Schmitz, Lars, CL Jarman, KM Harkins, M Kayser, BN Popp, and P Skoglund. 2017. Genetic ancestry of Rapanui before and after European contact. *Curr. Biol.* 27: 1-7.

Horsburgh, K. Ann, MD McCoy. 2017. Dispersal, isolation, and interaction in the islands of Polynesia: A critical review of archaeological and genetic evidence. *Diversity* 2017, 9, 37; doi: 10.3390/d9030037.

## **END SECTION THREE (Exam Three: April 22-27)**

## Department of Anthropology and University Policies

ADA Statement: The Americans with Disabilities Act. The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness ([www.wellness.utah.edu](http://www.wellness.utah.edu); 801-581-7776).

Student Code: (Policy 6-400) All students are expected to maintain professional behavior in the classroom setting, according to the Student Code ([regulations.utah.edu/academics/6-400.php](http://regulations.utah.edu/academics/6-400.php)). Students have specific rights in the classroom as detailed in S. II of the Code. The Code also specifies standards of behavior (S. III) and academic conduct (S. V). "Students must adhere to generally accepted standards of academic honesty, including but not limited to refraining from cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating" (S. VB). According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors. Students have the right to appeal such action to the Student Behavior Committee.

Incomplete Policy: An "I" will only be given for work not completed because of circumstances beyond the student's control, providing the student is passing the course and needs to complete 20% or less of the work. Valid reasons for an "I" grade include: (a) An illness (documented by a medical statement) that precludes the ability of the student to perform; (b) an accident or situation that prevents the student from physically being present (documentation may be required); (c) Extreme emotional or other mental circumstances that are severe enough to interfere with a student's normal academic performance. If you do receive an "I", do not register for the course again. You must complete the required work in the time agreed by you and the instructor. If the work is not completed within one year, the grade will change to an "E". Faculty will not accept additional work to change the grade after that one-year period. If a student has a problem with the course, please deal with it immediately. It is the student's responsibility to contact instructors and submit necessary forms.

Note: The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.