This course is intended to build a broad (not necessarily deep) foundation in graduate level theory and methods of physical/biological anthropology. This foundation will be assumed for other graduate classes in physical/biological anthropology, which will build upon this foundation in directions that are appropriate for that class.

The approach will be primarily lecture, though there will be some student discussion. There will be a considerable hands-on component, in that students will apply several methods to a set of data and interpret the results in light of theory.

This class is intended for MA and PhD students in physical/biological anthropology, though other students with an interest in the subject are welcome.

Outcomes

Students who do well in this class can expect the following outcomes.

• Develop familiarity with the terminology and basic principles of evolution at the population (microevolutionary) and species (macroevolutionary) levels.
• Master basic bioanthropological theory.
• Gain competence with a variety of techniques, approaches, and methods of analysis, including the use of common software.
• Build confidence and skill in interpreting the results of analyses within theoretical frameworks and presenting these results and interpretations professionally.
• Learn methods and standards for writing graduate level research papers.
• Become more comfortable with approaching anthropological phenomena at the level of process (why they are the way they are) rather than the level of description (what are they).

Administrivia

Readings are posted on Moodle. I expect you to have done the readings before coming to class. I would characterize the amount of reading required for this class as “medium”. For all the readings I indicate whether they should be read carefully for detail or read more cursorily for the main points. In general, a conceptual understanding is adequate for preparing you to follow my lectures, so don’t get bogged down in details.

Assignments are assigned and due at irregular intervals. Some assignments are “short assignments” designed to be done between the class meeting at which it is assigned and the next class meeting. Other assignments relate to the class project and are more substantive.
Grading will be based on short assignments (20%) and the project (80%). This class is traditional grading mode, meaning that it may not be taken CR/NCR.

Class Projects

Class Projects will start very early in the semester and will result in a paper and presentation at the end of the semester. The projects will be based on a set of data that I supply. There are several assignments/activities that are part of the project, some of which will serve as milestones in your work toward completing the project.

A. Very early in the term I will assign data sets to each student, partially based on student choice. The data sets will be subsets of the W. W. Howells craniometric data for one sex in some region of the world. Each data set will also include an outgroup (first population in the data set, having a population code of 1) that may be from a different region. Each data set will have between 7 and 10 populations (including the outgroup) some of which will be large samples and some probably very small samples. Each data set contains many measured variables for each individual. The available data sets are: African females, African males, Americas females, Americas males, Asian females, Asian males, Australian-Melanesian females, Australian-Melanesian males, China-Taiwan males, European females, European males, Japanese females, Japanese males, Micronesian males, Pacific Islands females, Polynesian males, Worldwide females, and Worldwide males.

B. The first graded project assignment will be a description of the populations in your data set. This will count for 15% of your grade. Eventually, this will become part of the materials and methods chapter of your term paper.

C. The second graded project assignment will be a regional literature review of what is known of the population history of your region. This will count 20% toward your grade. Eventually, this will form the bulk of the introduction chapter of your term paper. Most importantly, you should highlight at least one issue, set of alternative hypotheses, debate, or disagreement about the population history of your region. Having identified this issue, make a hypothesis you can test using your data and present it as the last paragraph(s) in your literature review. The rest of the assignments for the paper, especially the fourth part (paper itself) should be geared toward taking a side on, or adding a perspective to, this issue.

D. We will be having some workshops in the SSRL during which you will analyze your data sets. You are certainly welcome to do other analyses as well.

E. The third graded project assignment will be a description of the methods of analysis and a presentation of the results (without discussion). This will count 15% toward your grade. Eventually this will form the methods section of the materials and methods chapter and the results chapter of your term paper. Be sure to use good scientific paper format for this assignment (review the lecture early in the semester on scientific papers if necessary), remembering that the methods section needs to be distinct from the results section and is actually part of a chapter on “materials and methods” that is a completely separate chapter from your results. Also remember that any interpretations (what the results mean) are an entirely separate chapter called “discussion” and are not part of this assignment. You need to strike a balance on how much detail to include for methods, being thorough but avoiding giving an exact recipe as I do in the workshop notes.

F. The fourth graded project assignment will be the paper itself. This will count 20% toward your grade. From previous assignments you should have at least most of the introduction, materials and methods, and results chapters of your paper done. You
should revise your work from previous assignment for inclusion in your paper, and I will give you back points that you lost on the previous assignment for well done revisions. What remains to be done for the paper is to interpret your results in a discussion section and to come to one or more conclusions in a conclusions section.

G. The fifth graded project assignment will be a short presentation of your results (10 minutes) during the scheduled final exam period. This will count 10% toward your grade. In your presentation you should present the issues that you identified to test with your analyses, a brief summary of your results, a brief summary of your discussion, and any conclusions you drew. You do not have to describe your methods, since these will be the same for everybody, unless you have done additional analyses beyond what is required in the assignments.

**Communication Resources:**

**Moodle**

The class will utilize a Moodle supplement as our primary communication and document submission system. I'll give a brief demonstration of Moodle but if you have trouble you should visit the IT Central Help Desk in SS 120. I am not a Moodle administrator or tech person, so I can only be responsible for content on Moodle – not for issues of access or technical problems.

**Email**

I will probably email a lot through Moodle. This seems like the only convenient way to return your graded assignments to you. You should plan to check your official email address (as listed by Moodle) often.

**My Philosophy on Graduate Education**

Graduate education is designed to help graduate students make the transition between two modes of learning. As undergraduates you participated almost entirely in a mode of learning that was instructor driven. That is, the instructor determined every detail of what the material of the class was going to be. Then the instructor lectured, you read the textbook, you took notes, and at some point you took an exam designed to “capture” the amount you had learned as a number that was combined with other such numbers to eventually give you a grade for the class.

In contrast, observe how your professors learn things. If they want to learn something new do they take a class? Usually not. Instead, they go to the library and the internet to find books and articles on the subject, read these materials, and therefrom gain the knowledge they are seeking. Further, your professors engage in research, in which they actually generate new knowledge – the raw material for all those books and articles.

One view of graduate education sees a field (say anthropology) as a geographic region (say Missoula County). Introductory classes are like a brief tour of the region (say pointing out Missoula, Mount Jumbo, the Clark Fork River, etc.). Upper level undergraduate classes explore certain parts of the region in more detail (say a detailed study of the Clark Fork river system). In this view, graduate education is partly a continuation of this trend of exploring an ever more detailed part of the region (say Rattlesnake Creek). However, the most important part of a graduate education is not the details of the region but learning how to use certain tools (say GPS units and compasses) to explore the region on your own. If you know how to use those tools you can explore any part of the region to any level of detail you desire. Eventually, as the culmination of your graduate experience, your mentor will ask you to choose an unexplored (or underexplored) part of the region and send you out to explore and map it (i.e. write a thesis or dissertation).
Therefore, in my view, graduate education is about learning how to use the tools of an academic. These tools are many, but pretty obvious. I also consider it part of my job to challenge you in such a way that you improve in your use of these academic tools. In evaluating your performance I give higher weight to your ability to use these tools than I do to your detailed knowledge of a certain area of the field.

**Student Conduct**

The most important thing I expect is mutual respect and tolerance. Respect for, and cultivation of diversity is a fundamental value for anthropologists. In fact, the UM faculty exhibits a large amount of intellectual diversity. I disagree with my colleagues about many things, yet I have deep respect for all of them and tolerance of those cases in which their views differ from mine. I do not feel that I (or they) or my views (or theirs) are in any way diminished by the fact that a colleague disagrees. Further, we should value the diversity of viewpoints that exist – we are all much better because of it. In this class we are not members of different “teams” – we are all colleagues. We are not in competition – we are in cooperation to gain as deep an understanding of the topic of this class as possible. Our understanding will be deeper because of differences in opinions and viewpoints. The class session must be a safe environment in which to speak or share an idea, no matter how far out it may seem to anyone else. I will enforce this. I encourage people to respectfully “talk out” their differences in opinions about an issue. However, if a comment or idea seems too inappropriate it is often best to simply ignore it and move on.

Graduate students are expected to follow the student conduct code, located at http://life.umt.edu/vpsa/student_conduct.php.

**My Policy on Collaboration**

Students are encouraged to work together, including working together on completing the assignments. There is never a penalty for working with or consulting other people so long as you acknowledge them. I have two requirement for collaboration – (1) in your write-up you must acknowledge your collaboration with other students or faculty, and (2) that every student produces a unique individual write-up or analysis. The second requirement will probably take care of itself since every student will be working with their own unique data set, but if I receive assignments from two or more students that are “too similar” I will split the credit for the assignment between them.

**Readings on Moodle**

In general, do the readings in the order listed on Moodle. For example, for the first class meeting read Leslie & Little (2003) before reading read Cavalli-Sforza et al. (1994) section 1.1, and read Richerson & Boyd (2002), last.

I use the following notations to guide you as how a particular reading should be read.  
* = Read carefully before class,  
# = Read for main points before class,  
% = For reference – don’t read it, but keep it handy as you will need to refer to it.
Welcome to ANTY 515: Theory & Methods in Biological Anthropology, Autumn 2013

Note that this semester academic weeks run from Thursday thru Wednesday rather than the normal Monday thru Friday. So, assignments due during a certain week are due on a Wednesday at 11:59pm Mountain Time.

Readings marked * should be read carefully. Readings marked # should be read for main points (especially don’t get bogged down in the math).
Readings marked % should be saved for later use.

August 31 - September 6

R: What is Theory in Biological Anthropology?

Lecture 1: What is Theory in Bioanth
*Leslie & Little, 2003
*Cavalli-Sforza et al, 1994, Section 1.1
#Richerson & Boyd, 2002

T: History of Physical/Biological Anthropology

Lecture 2: History of Phys Anth
#Little & Sussman, 2010
#AAPA Code of Ethics
%Hwells, 1973
%Hwells 1989 5MB
%Hwells 1995 3.7MB

September 7 - September 13

R: Scientific Writing

Lecture 3: Scientific Paper Format

- Anonymous, n.d., Characteristics of an Excellent Paper
- Skelton, 2006, Proper Citations (Avoiding Plagiarism)
- Skelton, 2012 Citing Analytical Software
- #GMU Guide to writing a paper in the Biological Sciences
- #U Wis Wisc Writer's Handbook. CSE Name-Year Documentation
- %Kawakubo et al. 2009

T: DNA, Mendelian Traits, Quantitative Traits, and Heritability

Lecture 4: DNA, Mendelian Traits, Quantitative Traits, Heritability

- Cavalli-Sforza et al., 1994, Section 1.2
- Nuffield Council on Bioethics, 2002, Ch 4
- #US Dept Health & Human Servs, 2010, Ch 1
- #Holsinger, 2010, Chapter 18

Short Assignment 1

September 14 - September 20

Begin working on your population description part of the term project. Look below for the due date.

Paper Assignment 1: Population Descriptions 29.9KB

R: Workshop on Library Research. Meet in the SSRL (SS 262)
T: Evolutionary Theory, Population Genetics & HW

Lecture 5: Evolutionary Theory, Population Genetics & HW
* Cavalli-Sforza et al., 1994, Section 1.4
# Holsinger, 2010, pp 1-14

Short Assignment 2

September 21 - September 27

R: Mutation and Selection

Lecture 6: Mutation and Selection
* Schleif, 1993, pp 227-235
# Holsinger, 2010, pp 69-100

Short Assignment 3

T: Gene Flow and Genetic Drift

Lecture 7: Gene Flow and Drift
* Barbujani, 2008
# Holsinger, 2010, pp 103-115, 275.6KB

Short Assignment 4

Population Descriptions Due
Email your document to Skelton.
Please include your name as part of the name of your file.

September 28 - October 4
Begin working on regional literature review for your term project. Look below for the due date. The Bellwood (2013) text, The Global Prehistory of Human Migration, ISBN 978-1-118-97059-1, is a good resource for at least most of you.

Paper Assignment 2: Regional Review 41.6KB
13.4MB

R: Non-Random Mating, Pedigrees, and Inbreeding

Lecture 8: Non-Random Mating, Pedigrees, & Inbreeding 118.6KB
*O’Neill, 2011
Short Assignment 5

T: Variability in Gene Expression

Lecture 9: Variability in Gene Expression
*UCCP, 2001
#Strachan & Read, 1999, Ch 8
Short Assignment 6

October 5 - October 11

R: Polymorphism, Neutralism and Selectionism

Lecture 10: Polymorphism, Neutralism, Selectionism
*Cavalli-Sforza et al., 1994. Section 1.3
#Holsinger, 2010, pp 197-230
#Ohta, 2002. Near Neutral Theory 84.3KB
Short Assignment 7

T: Statistical inference, Data, and Variables
October 12 - October 18

R: Principal Components, Distance, Clustering, et al.

Lecture 12: PC's et al.

*Statsoft Inc 2012a
*Statsoft Inc 2012b
*Statsoft Inc 2012c
*Statsoft Inc 2012d
#Cavalli-Sforza et al., 1994, Sections 1.11
#Cavalli-Sforza et al., 1994, Sections 1.13

T: Models of Population Formation & History

Lecture 13: Models of Popn Formation

#Cavalli-Sforza, 2002
#Moore, 1994
#Cavalli-Sforza et al., 1994, Section 1.7

October 19 - October 25

R: Workshop on Data Processing. Meet in the SSRL. Bring your data on a memory stick.
Workshop on Data Processing

#Cavalli-Sforza et al., 1994, Section 1.10
#Hammer, 2011

T: Diffusionist Approach: Population Structure

Lecture 14: Diffusionist Approach: Population Structure

#Holsinger, 2010, Chs 5, 6, 8, 9
#Cavalli-Sforza et al., 1994, Section 1.16

Short Assignment 11

October 26 - November 1

R: Cladistic Approach: Phylogenetics

Lecture 15: Phylogenetics

#Cavalli-Sforza et al., 1994, Section 1.12
*Gregory, 2008
#Theobald, 2012a

Short Assignment 12

T: Ethnogenetic Approaches: Mixed Strategies and Networks

Lecture 16: Ethnogenetic Approaches

*Baum, nd
#Cavalli-Sforza et al., 1994, Sections 1.15
#Cavalli-Sforza et al., 1994, Sections 1.17
#Von Cramon-Taubadel & Pinhasi, 2011
#Posada & Crandall, 2001

Short Assignment 13

November 2 - November 8
R: Workshop on RMET. Meet in the SSRL. Bring your data on a memory stick.

Workshop on RMET
%Skelton, 2012, RMET Annotated Output

T: Macroevolution, Speciation

Lecture 17: Speciation
#Maynard Smith, 1998, Ch 14
#Maynard Smith, 1998, Ch 15
Short Assignment 14

Regional Literature Review Due
Email it to Skelton.
Please include your name as part of the name of your file.

November 9 - November 15

Begin working on the analytical methods and results section of your term project. Look below for the due date.

Paper Assignment 3: Analytical Methods and Results 52.6KB

R: Workshop on UPGMA and NJ. Meet in the SSRL. Bring your data on a memory stick.

Workshop on UPGMA and NJ

T: Taxonomy and the 2nd and 3rd Laws

Lecture 18: Taxonomy and the 2nd and 3rd Laws 134.5KB
November 16 - November 22

R: Evolutionary Analysis

Lecture 19: Evolutionary Analysis

#Haber, 2008

#Theobald 2012b

Short Assignment 15

T: Demographic Theory

Lecture 20: Demographic Theory 126.3KB

*Gage_2000_Demography 2.3MB

#McFalls, 2007. Population, a Lively Discussion 556.8KB

Short Assignment 17

Analytical Methods and Results Due

Email it to Skelton.
Please include your name as part of the name of your file.

November 23 - November 29

Begin working on your term paper for your term project. Look below for the due date.

Paper Assignment 4: Final Term Paper 31.2KB

R: Thanksgiving Holiday
T: Demography and Paleodemography

Lecture 21: Demography and Paleodemography 172.2KB
*Milner et al._2000_Paleodemography 2.3MB
#Annotated Demographic Lifetable for the Guarani 17.2KB
#Paleodemographic Lifetable for Tlajinga 116.2KB
#USAID_rd_Lesson 3: Life Tables 139.5KB

Short Assignment 18

November 30 - December 6

R: Theory of Working With Individuals in Paleoanthropology

Lecture 22: Theory of Working With Individuals in Paleoanthropology 62.6KB
*Ackermann & Smith, 2007
Short Assignment 19
Press Release: Ethiopian jawbone may mark dawn of humankind 1MB

T: Theory of Working With Individuals in Forensic Anthropology

Lecture 23: Theory of Working With Individuals in Forensic Anthropology 197.4KB
*Spradley et al. 2008
Short Assignment 20

December 7 - December 13

R: Genetics of Behavior

Lecture 24: The Genetics of Behavior 164.1KB
*Nuffield Council on Bioethics, 2002, Chapter 3: Research in Behavioral Genetics 154.3KB
**Short Assignment 21**

**T: Race**

**Lecture 25: Race 203.8KB**

**Smedley & Smedley 2005 125.8KB**

**Cavalli-Sforza et al. 1994. Sections 1.5 and 1.6. 1.6MB**

**Term Paper Due**

Email it to Skelton.

Please include your name as part of the name of your file.

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**December 14 - December 20**

**Scheduled Final Exam Day, 9:30 until done: Presentations on Projects**

Class Presentations: Time limit of 10 minutes. I will cut you off even if you're not finished after 12 minutes.

- Start by presenting the problem/question/issue/hypothesis you are addressing

- Briefly describe your data set (e.g. Siberian males including Chinese, North Japanese, Ainu, Chukchi, Eskimo, Yakut, Buriat, and Orochi).

- No need to describe measurements since we all have the same ones
• No need to describe your 'common to all' methods -- those we did in a workshop

• If you depart from the methods we did in a workshop you should describe what you did that was different. This includes using subsets of your data set.

• Only present the most important figures or tables, especially those from which you draw important insight about your problem/issue/question/hypothesis.

• Discuss your results (i.e. what they mean) as you present each important figure or table. This is one way in which a scientific presentation differs from a scientific paper in format

• End with a conclusion about your problem/issue/question/hypothesis. In other words, come to a point.