

ANTHROPOLOGY 349D
ANTHROPOLOGICAL GENETICS
FALL 2010

COURSE INFORMATION: Unique #30200
TTh 2:00-3:30 pm, EPS 2.136

COURSE INSTRUCTOR: Dr. Deborah Bolnick
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Phone: (512) 471-7532
Office Hours: EPS 1.106, TTh 3:30-4:30 pm *or by appointment*

COURSE DESCRIPTION:

This course explores the intersection of genetics and anthropology. We will cover the basic principles of molecular and population genetics as relates to the study of humans and non-human primates. We will discuss the ways in which genetics can contribute to the field of anthropology, as well as how anthropological knowledge can illuminate genetic research. This class will be a mix of lecture, discussion, and labwork. Lectures will generally occur on Tuesdays, whereas Thursdays will be devoted to discussions of the assigned readings or laboratory work. You will gain some hands-on experience in genetic analysis and will learn to understand and evaluate molecular anthropology research. We will work to improve your writing skills through short, informal writing assignments and a longer research paper.

COURSE REQUIREMENTS:

- 1. Exam 1 (20%).** The first exam on **October 7** will cover material from lectures, discussions, labs, *and* readings. The exam may include multiple choice, matching, short answer, and essay questions.
- 2. Exam 2 (20%).** The second exam on **November 18** will cover material presented in the lectures, discussions, labs, *and* readings following the first exam. Exam format will be similar to that of the first exam.
- 3. Short Writing Assignments (10%).** Four short writing assignments (1 page each, double-spaced) will be given over the semester. In some assignments, you will reflect on the assigned readings before coming to a class discussion; in others, you will apply what you have learned in class to analyze a genetic dataset. These assignments will be graded based on the thought and effort you put into the assignment, and will give you the opportunity to receive some informal feedback on your writing.
- 4. Class Participation (15%).** This portion of your grade will be based on your participation in class activities and discussions. On one discussion day, you will be responsible for (a) orally summarizing the main points of the readings for the class, and (b) providing questions to help guide the class discussion. This activity will make up 1/3 of your class participation grade.
- 5. Research Paper (30%).** The research paper (10-12 pages, double-spaced) will allow you to explore a relevant topic of your choice in more detail. A 2-page proposal and bibliography (5%) is due on **October 19**. Part 1 of the paper (10%) is due on **November 2**. After receiving feedback, you will make revisions and submit your final research paper (15%) on **November 30**. Paper instructions will be handed out in September.
- 6. Research Presentation (5%).** Each student will give a 7-8 minute presentation on the subject of their research paper on **December 9**.

REQUIRED READINGS:

1. Relethford, John H. 2003. *Reflections of Our Past*. Boulder: Westview Press.
2. A packet of other required readings is available at Abel's Copies (University Towers, 715D West 23rd Street, 472-5353).

COURSE WEBSITE:

Class information, handouts, and a discussion forum will be available at the course website on Blackboard (<http://www.courses.utexas.edu>). Course updates will also be sent to your university e-mail account. Please check both regularly.

GRADING POLICIES:

If an assignment is turned in late, the assignment grade will be lowered by 10% for each day that the assignment is late. If a serious issue (i.e. illness, family death, etc.) arises that may prevent you from attending class, turning in an assignment on time, or taking an exam, contact Dr. Bolnick by e-mail or telephone *as soon as possible* to discuss an assignment extension or to schedule a make-up exam.

Final letter grades will be assigned using the following scale: A (90-100%), B (80-89%), C (70-79%), D (60-69%), F (0-59%). Plus/minus grades will be assigned.

Re-grading Policy: If you believe that an exam or assignment has been graded incorrectly, submit a written request for a re-grade to Dr. Bolnick within one week of when the graded exam or assignment was returned. The written request should include an explanation of your position and be attached to the graded exam or assignment. If you suspect that a simple addition error was made, speak to Dr. Bolnick to have the error corrected.

Credit/No-Credit Policy: To receive credit for this course if you enrolled on the pass/fail basis, you must 1) take the two exams, 2) turn in a paper proposal, part 1 of the research paper, and final research paper, 3) complete at least three of the short writing assignments, and 4) receive the equivalent of a D or higher in this class.

Cheating/Plagiarism Policy: If you cheat or plagiarize, the university guidelines for disciplinary action will be followed. Any cheating or plagiarism will be reported to the Dean of Students and will result in failure of this course. For more information, see <http://deanofstudents.utexas.edu/sjs> (especially the sections on *Academic Integrity*, *Plagiarism*, and *Discipline Procedures*).

Accommodations: I encourage students with disabilities to meet with me at the beginning of the semester to discuss any needs. Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) may arrange accommodations with Services for Students with Disabilities, located in the Student Services Building (see <http://deanofstudents.utexas.edu/ssd> or call 471-6259 or TTY 471-4641 for more information).

Attendance: I do not take formal attendance, but I am aware of who consistently comes to class and who does not. Attendance is necessary to earn the points for class participation, and consistent attendance can help to raise your grade if you end up with a borderline final grade. Whether or not you come to class, you are responsible for keeping up with what happens in class.

SCHEDULE OF TOPICS, READINGS, AND IMPORTANT DATES:

(L) = lab; (D) = class discussion; SWA = Short Writing Assignment

* indicates readings that must be completed BEFORE coming to class

<u>Date</u>	<u>Topic and Readings</u>
Thurs., Aug. 26	Introduction and History <u>Reading:</u> O'Rourke; Marks (A)
Tues., Aug. 31	DNA, Genes, and Mutations <u>Reading:</u> Stone & Lurquin; Dolgin
Thurs., Sept. 2	(L) DNA Extraction and Polymerase Chain Reaction Lab (in PAT 609) <u>Reading:</u> Hartl & Jones (A)
Tues., Sept. 7	(D) Folk Heredity and Eugenics; SWA 1 Due <u>Reading:</u> *Scheinfeld, *Allen, *Sinnott & Dunn, *Kalb
Thurs., Sept. 9	<i>NO CLASS (Rosh Hashanah)</i>
Tues., Sept. 14	Genome Complexities <u>Reading:</u> Commoner, Gibbs, Pray, Zimmer
Thurs., Sept. 16	(D) Genetic Essentialism; SWA 2 Due <u>Reading:</u> *Nelkin & Lindee, *Roof
Tues., Sept. 21	Population Genetics I <u>Reading:</u> Mielke et al.
Thurs., Sept. 23	(L) Gel Electrophoresis and RFLP Lab (in PAT 609) <u>Reading:</u> Hartl & Jones (B)
Tues., Sept. 28	Population Genetics II; SWA 3 Due <u>Reading:</u> Fix, Mielke & Fix
Thurs., Sept. 30	(D) Admixture; Overview of Research Paper Assignment <u>Reading:</u> * <i>Reflections of Our Past</i> chapter 10; Hafner
Tues., Oct. 5	Population Genetics III; Review for Exam
Thurs., Oct. 7	Exam 1
Tues., Oct. 12	(L) DNA Sequence Analysis Lab
Thurs., Oct. 14	(D) Genetic Kinship <u>Reading:</u> *Nash, *Tallbear, *Bardill
Tues., Oct. 19	Film: <i>Motherland</i> ; Research Paper Proposal and Bibliography Due

<u>Date</u>	<u>Topic and Readings</u>
Thurs., Oct. 21	(D) Genomics, Ancestry, and Identity <u>Reading:</u> *Bolnick et al., *Rotimi, *Nelson
Tues., Oct. 26	(D) Medical/Forensic Genetic Testing <u>Reading:</u> *Lee and Crawley, *onthesamepage.berkeley.edu (including FAQ), *Jabr, *Kowarski, *Obasogie
Thurs., Oct. 28	Humans and Apes <u>Reading:</u> Marks (B), <i>Reflections of Our Past</i> chapter 2, Cohen
Tues., Nov. 2	Ancient DNA; Research Paper Part 1 Due <u>Reading:</u> Kaestle & Horsburgh
Thurs., Nov. 4	(D) Neandertals <u>Reading:</u> * <i>Reflections of Our Past</i> chapter 4, *Herrera et al., *Dalton, *Gibbons, *Krause et al.
Tues., Nov. 9	Modern Human Origins <u>Reading:</u> <i>Reflections of Our Past</i> chapter 3, Weaver & Roseman
Thurs., Nov. 11	(D) Human Genetic Diversity <u>Reading:</u> * <i>Reflections of Our Past</i> chapter 5, *Barbujani and Colonna
Tues., Nov. 16	Prehistoric Migration I: Colonization of the Americas; SWA 4 Due <u>Reading:</u> <i>Reflections of Our Past</i> chapter 6, Goebel et al.
Thurs., Nov. 18	Exam 2
Tues., Nov. 23	Prehistoric Migration II: Europe and the Pacific <u>Reading:</u> <i>Reflections of the Past</i> chapters 7-9
Thurs., Nov. 25	<i>NO CLASS (Thanksgiving)</i>
Tues., Nov. 30	Primate Evolution; Final Research Paper Due <u>Reading:</u> Surridge et al.
Thurs., Dec. 2	(D) Primate Behavior <u>Reading:</u> *Utami et al., *Ross et al., *Mitani et al.
Thurs., Dec. 9	Student Presentations (2-5 pm)

CONTENTS OF THE COURSE READER:

- O'Rourke DH. 2003. Anthropological genetics in the genomic era: a look back and ahead. *American Anthropologist* 105:101-109.
- Marks, J. (A) 2008. The construction of Mendel's laws. *Evolutionary Anthropology* 17:250-253.
- Stone L, Lurquin PF. 2007. *Genes, Culture, and Human Evolution: A Synthesis*. Malden, MA: Blackwell Publishing. pp 48-72.
- Dolgin E. 2009. The genome finishers. *Nature* 462:843-845.
- Hartl DL, Jones EW. (A) 2001. *Genetics*. Fifth edition. Sudbury, MA: Jones and Bartlett Publishers. pp 58-64.
- Scheinfeld A. 1944. The Kallikaks after thirty years. *Journal of Heredity* 259-264.
- Allen, GE. 1997. The social and economic origins of genetic determinism: a case history of the American eugenics movement, 1900-1940 and its lessons for today. *Genetica* 99:77-88.
- Sinnott EW, Dunn LC. 1925. The problems of eugenics. *Principles of Genetics: An Elementary Text, with Problems*. New York: McGraw-Hill Book Co. pp 402-415.
- Kalb C. 2004. Brave new babies. *Newsweek* January 26:44-52.
- Commoner B. 2002. Unraveling the DNA myth. *Harper's Magazine* February: 39-47.
- Gibbs WW. 2003. The unseen genome: gems among the junk. *Scientific American* 289:46-53.
- Pray LA. 2004. Epigenetics: genome, meet your environment. *The Scientist* 18:14-20.
- Zimmer C. 2008. Now: the rest of the genome. *New York Times* (November 11).
- Nelkin D, Lindee MS. 1995. *The DNA Mystique*. New York: W.H. Freeman and Co. pp 1-16.
- Roof J. 2007. *The Poetics of DNA*. Minneapolis: University of Minnesota Press. pp 70-114.
- Mielke JH, Konigsberg LW, Relethford JH. 2005. *Human Biological Variation*. Oxford: Oxford University Press. pp 47-85.
- Hartl DL, Jones EW. (B) 2001. *Genetics*. Fifth edition. Sudbury, MA: Jones and Bartlett Publishers. pp 50-58, 65-76.
- Fix AG. 1999. *Migration and Colonization in Human Microevolution*. Cambridge: Cambridge University Press. pp 51-74.
- Mielke JH, Fix AG. 2007. The confluence of anthropological genetics and anthropological demography. In: Crawford MH, editor. *Anthropological Genetics*. Cambridge: Cambridge University Press. pp 112-140.
- Hafner K. 2007. Seeing corporate fingerprints in Wikipedia edits. *New York Times* (August 19).
- Nash C. 2004. Genetic kinship. *Cultural Studies* 18:1-33.
- TallBear K. 2008. Native-American-DNA.com: in search of Native American race and tribe. In: Koenig BA, Lee SS, Richardson SS, editors. *Revisiting Race in a Genomic Age*. New Brunswick: Rutgers University Press. pp 235-252.
- Bardill J. 2010. Information and misinformation already had: DNA and tribal citizenship. *Gene Watch* 23:8-9, 23.
- Bolnick DA, Fullwiley D, Duster T, Cooper RS, Fujimura JH, Kahn J, Kaufman JS, Marks J, Morning A, Nelson A, Ossorio P, Reardon J, Reverby SM, TallBear K. 2007. The science and business of genetic ancestry testing. *Science* 318:399-400.
- Rotimi CN. 2003. Genetic ancestry tracing and the African identity: a double-edged sword? *Developing World Bioethics* 3: 151-158.
- Nelson A. 2008. Bio science: genetic genealogy testing and the pursuit of African ancestry. *Social Studies of Science* 38:759-783.
- Lee SSJ, Crawley L. 2009. Research 2.0: social networking and DTC genomics. *American Journal of Bioethics* 9:35-44.
- Jabr F. 2010. Exposing the student body: Stanford joins U.C. Berkeley in controversial genetic testing of students. *Scientific American News*: July 6.

- Kowarski I. 2010. Students in Berkeley's DNA testing program won't get individual results. *The Chronicle of Higher Education*: August 12.
- Obasogie OK. 2009. *Playing the Gene Card?: A Report on Race and Biotechnology*. Oakland: Center for Genetics and Society. pp 31-44.
- Marks J. (B) 2002. *What It Means to Be 98% Chimpanzee*. Berkeley: University of California Press. pp 7-50.
- Cohen J. 2007. Relative differences: the myth of 1%. *Science* 316:1836.
- Kaestle FA, Horsburgh KA. 2002. Ancient DNA in anthropology: methods, applications, and ethics. *Yearbook of Physical Anthropology* 45:92-130.
- Herrera KJ, Somarelli JA, Lowery RK, Herrera RJ. 2009. To what extent did Neanderthals and modern humans interact? *Biological Reviews* 84:245-257.
- Dalton R. 2010. Fossil finger points to new human species. *Nature* 464:472-473.
- Gibbons A. 2010. Close encounters of the prehistoric kind. *Science* 328:680-684.
- Krause J, Lalueza-Fox C, Orlando L, Enard W, Green RE, Burbano HA, Hublin J-J, Hänni C, Fortea J, de la Rasilla M, Bertranpetit J, Rosas A, Pääbo S. 2007. The derived *FOXP2* variant of modern humans was shared with Neandertals. *Current Biology* 17:1908-1912.
- Weaver TD, Roseman CC. 2008. New developments in the genetic evidence for modern human origins. *Evolutionary Anthropology* 17:69-80.
- Barbujani G, Colonna V. 2010. Human genome diversity: frequently asked questions. *Trends in Genetics* 26:285-295.
- Goebel T, Waters MR, O'Rourke DH. 2008. The late Pleistocene dispersal of modern humans in the Americas. *Science* 319:1497-1502.
- SurrIDGE AK, Osorio D, Mundy NI. 2003. Evolution and selection of trichromatic vision in primates. *TRENDS in Ecology and Evolution* 18:198-205.
- Utami SS, Goossens B, Bruford MW, de Ruiter JR, van Hooff JARAM. 2002. Male bimaturism and reproductive success in Sumatran orang-utans. *Behavioral Ecology* 13:643-652.
- Ross CN, French JA, Orti G. 2007. Germ-line chimerism and paternal care in marmosets (*Callithrix kuhlii*). *Proceedings of the National Academy of the Sciences USA* 104:6278-6282.
- Mitani JC, Merriwether DA, Zhang C. 2000. Male affiliation, cooperation, and kinship in wild chimpanzees. *Animal Behaviour* 59:885-893.