

Copyright 2020 Susan Cachel

**Human Variation
Anthropology 356 (01:070:356:01)**

**Spring, 2020
S. Cachel**

The syllabus is available from the class Sakai site, accessible via the Rutgers Sakai portal (<http://sakai.rutgers.edu/portal>). Use your Rutgers Net ID and password to login to Sakai. Then click on this course among the list of courses that you are registered for. The syllabus is listed under the “Resources” section of the class site, and is labeled “356SYB.”

Course Venue: Tuesday, Thursday 2:15-3:35 P.M., Biological Sciences Building, Room 302, Douglass Campus

Instructor: Dr. Susan Cachel

Office: Room 203C, Biological Sciences Bldg., Douglass. Use the left staircase from the building entrance; turn right as you exit the stairwell to the 2nd floor. My office is in the complex of rooms through the steel door immediately to the right of the stairwell.

848-932-9270 (office)

848-932-9886 (department)

Cachel@anthropology.rutgers.edu

Office Hours (Spring Semester): Wednesday, 1-3 P.M, or by appointment

Course Description:

This is a course in physical anthropology that describes variation in living humans, and identifies the random or adaptive evolutionary processes responsible for this variation. It deals with genetic, anatomical, and physiological differences within and between populations. It deals with the effects of breeding isolation and small population size on human variation. It addresses human biological adaptation to climatic extremes, and the history and differentiation of major human population groups. Two fossil human groups (*Homo erectus* and the Neanderthals) will also be covered, because of adaptations to climatic extremes shown in these groups, and because of their importance in the history of human dispersal worldwide, and questions about the origins of anatomically modern humans. Lastly, the course will deal with modern human settlement throughout the world.

Course Objectives and Goals:

Students are introduced to the range of biological variation in living humans. They will understand that human variation has both genetic and environmental (including cultural) components, and that these components frequently interact. This variation has been evolving through time, as humans adapt to different environmental circumstances, and some of this variation is non-adaptive. Students will understand how humans are changing now, because human evolution is continuing. Students will be introduced to how variable human traits are analyzed during an in-class lab. Students will be able to analyze and to think critically about

articles in the popular press that deal with human differences, including genetic differences, and human adaptation and adaptability.

Required Texts:

1. Kenneth Kamler. 2004. *Surviving the Extremes. What Happens to the Body and the Mind at the Limits of Human Endurance*. Penguin. (paperback).
2. Stephen Molnar. 2005. *Human Variation: Races, Types, and Ethnic Groups*. 6th ed. Prentice Hall. (paperback).
3. John Relethford & Deborah Bolnick. 2018. *Reflections of Our Past. How Human History is Revealed in Our Genes*. 2nd ed. Routledge (paperback).

All texts are available from the Rutgers University Bookstore on Somerset Street in downtown New Brunswick.

The class Sakai site is accessible via the Rutgers Sakai portal (<http://sakai.rutgers.edu/portal>). Login using your Rutgers net I.D. and password. Class announcements will appear here. You must regularly check your Rutgers email account to see these announcements directly after they are emailed out. Necessary course material is downloadable from this site (e.g., the syllabus, the lab sheets, tables, pdf files of papers, etc.)

Attendance Policy: Students are expected to attend all classes. If you miss one or two classes, you must use the Rutgers University absence reporting website to indicate the date and reason for your absence. An e-mail is then automatically sent to instructors. The URL for this website is <https://sims.rutgers.edu/ssra/>. In cases where students miss classes for periods longer than a week, this website will automatically direct them to consult a Dean of Students for assistance, and will help to verify the circumstances of their absence. If students are absent from class for long periods without a verified cause, the Dean's Office may direct the Rutgers Police to conduct a "Wellness Check." Note: Health, accident, and family issues are valid reasons for missing class; vacations, etc. are not.

Scholarship and Class Etiquette: The Rutgers School of Arts and Sciences mandates that instructors immediately report all cases of suspected plagiarism and cheating to the Academic Deans. Please turn off cell phones while in class. It is all right to use laptops for taking notes. It is not all right to surf the web during class. This irritates the instructor (me), and is rude and distracting to other students.

Course Requirements:

Two exams each account for 25% of the final grade, for a total of 50%. The second exam is not cumulative. The format of the exams will be multiple choice and short answers. I will not consider giving a make-up exam, unless I am first contacted about your absence either before or immediately after the class exam. Participation in **one in-class lab** accounts for 10% of the final grade. **Four video responses** each account for 5% of the final grade, for a total of

20%. Each response will answer several questions that I will pose before the video. Each response will be turned in immediately after class.

A short paper (4-5 pages, double-spaced) will account for 20% of the final grade. Using information and an anthropological perspective provided by this course, the short paper should critically analyze a recent popular magazine article (e.g., one appearing in *National Geographic*, *The New Yorker*, *Self*, *Discover*, *Psychology Today*, *Scientific American*) or a major newspaper article (e.g., a multi-page article appearing in the weekly *Wall Street Journal* or *New York Times* Science section) published within the last 1-2 years. The full citation for the article must appear at the beginning of the paper. The article must deal with a topic covered in the course. Ask me, if you are in doubt about the appropriateness of an article. You must analyze the article, not simply describe it. The short paper is due on the last day of class (April 30th). I must have a hardcopy version of the paper, not an emailed attachment.

I will lower grades on any paper turned in late.

I advise class attendance, because lecture material is up-to-date and interpretive, and may not be covered in the textbooks. Lecture material will be intensively covered in the exams.

COURSE SCHEDULE, TOPICS, & READINGS

January 21 Introductory (course topics and requirements)

January 23 History of the Study of Human Adaptation & Variation
Cachel 2003 Grzimek.pdf (pdf file on Sakai)—click on “Resources”
Relethford & Bolnick, pp. 1-40

January 28 The Structure of DNA; Chromosomal Territories and Interactions
Relethford & Bolnick, pp. 41-71

January 30 Comparative Genomics; Cell Division & Gametogenesis
Molnar, ch. 1; Relethford & Bolnick, pp. 213-232

February 4 Principles of Genetics
Relethford & Bolnick, pp. 233-242 (studying DNA)

February 6 Simple Mendelian Genetics; Pedigree Analysis

February 11 Populations; Population Isolates; Irish History as an Example of Population Change
Relethford & Bolnick, pp. 163-182

February 13 Natural Selection & Random Change in Small Groups
Relethford & Bolnick, pp. 183-211

February 18 Dominant & Recessive Inheritance in Humans; Evolutionary Development (“Evo-Devo”) in Humans
Molnar, ch. 2

February 20 **In Class Lab Exercises—examining a human trait of purely genetic determination & a human trait determined by both genetics and environment**

Read “The Thousand Year Graveyard,” by Ann Gibbons, *Science*, Dec. 13, 2013. The text, slideshows, and videos are accessible at <http://scimag/thouyear>. This material explores the changing record of death and disease in a 1,000-year-old graveyard in Tuscany, in northern Italy. It therefore explores ongoing human evolution within the same population.

February 25 **1st Video: “Ghost in Your Genes”**
Turn in response paper immediately after class.

February 27 Mutations; Aneuploidy; Sex-Linked & Sex-Limited Inheritance in Humans; Imprinting; Chromosomal Abnormalities; Genes & Development
Molnar, ch. 7

March 3 **2nd Video: “Spillover: Zika, Ebola, and Other Emerging Pathogens”**
Turn in response paper immediately after class.

March 5 Balanced Polymorphism in Humans
The Online Mendelian Inheritance in Man (OMIM) database; Human Behavioral Genetics

March 10 Nutrition & Disease; Parasites and Human Evolution
Kamler, pp. 17-83

March 12 The Human Microbiome; Disease & Human Evolution

Week of March 16—NO CLASSES (Spring Recess)

March 24 **EXAM I**—Topics from January 21-March 12

March 26 Variation in Human Size & Shape; Human Sexual Differences (Sexual Dimorphism)
In Class Exercise—Anthropometry (Bring pen, paper, and a calculator to class.)
Molnar, ch. 5

March 31 Variation in Human Pigmentation (Skin, Hair, & Eyes); Dermatoglyphics; Craniofacial & Dental Variation
Molnar, ch. 6

April 2 Variation in Human Biochemistry (Human Protein Polymorphisms)
Molnar, ch. 3

April 7 Variation in Human Blood Groups; the HLA System
Molnar, ch. 4

April 9 Heat Adaptation as an Explanation for Variation; *Homo erectus*; dispersal to Eurasia; insular dwarfing in *Homo erectus*? (Human fossil material from the island of Flores—what is it?)
Kamler, pp. 124-155

April 14 **3rd Video: “Deadly Ascent”**

Turn in response paper immediately after class.

Altitude Adaptation as an Explanation for Variation

Kamler, pp. 211-235

April 16 **NO CLASS—AAPA meeting (Los Angeles)**

April 21 Cold Adaptation as an Explanation for Variation; the Neanderthals

Kamler, pp. 183-211

April 23 The Problems of Classifying Humankind; Population Differentiation & Population History; How Far Back Can Modern Variation be Traced? (The Origin of Races); Modern Human Origins—Hybridization with Neanderthals, Denisovans, and at Least 2 Other Fossil Human Groups

Cachel 2012 Peopling of the Globe.pdf (pdf file on Sakai); Molnar, ch. 8; Relethford & Bolnick, pp. 73-96

April 28 Human Population Differentiation in Eurasia; Human Population Differentiation in Sub-Saharan Africa; Amerinds, Eskaleuts (Eskimos [Inuit] and Aleuts), & the Peopling of the Americas; Australoids & the Peopling of the Pacific; Modern Humans Colonize the Entire Globe through Biological and Cultural Factors

Molnar, ch. 9; Relethford & Bolnick, pp. 97-120

April 30 **4th Video: “First Peoples—Australia”**

Turn in response paper immediately after class.

Relethford & Bolnick, pp. 121-162

SHORT PAPER DUE!

EXAM II (topics from March 26-April 30) Friday, May 8th, 8-11 A.M. (location probably in our normal classroom)