ANTH 175: EVOLUTIONARY MEDICINE  
Fall Quarter 2015 (CRN: 10246)  
Lillis 282  
Monday/Wednesday 4:00-5:20 pm

4 Credit Hours; Satisfies an SC Group Requirement

Instructor: Dr. Josh Snodgrass (website: [http://www.pinniped.net/snodgrass.html](http://www.pinniped.net/snodgrass.html))  
Office Hours: Mon. 2-3 & Wed. 2:30-3:30 pm, & by appointment (@ Espresso Roma coffee shop on 13th)  
Office Location: 354 Condon Hall (Regular office hours @ Espresso Roma coffee shop on 13th)  
E-mail: jiosh@uoregon.edu  
Phone: 541-346-4823

Graduate Teaching Fellows (GTFs):  
Melissa Liebert ([liebert@uoregon.edu](mailto:liebert@uoregon.edu))  
Office Hours: TBA; Office: TBA  
Josh Schrock ([joshua.matthew.schrock@gmail.com](mailto:joshua.matthew.schrock@gmail.com))  
Office Hours: TBA; Office: TBA

Course Description: Application of evolutionary thinking to the study of human health and disease

Format: Lecture and required weekly laboratory sections.

Course Content: This course provides an introduction to evolutionary (or Darwinian) medicine, a relatively new field that recognizes that evolutionary processes and human evolutionary history shape health among contemporary human populations. The field of evolutionary medicine emphasizes ultimate explanations, such as how natural selection and other evolutionary forces shape our susceptibility to disease; this perspective complements that of biomedicine, which generally focuses on identifying the immediate mechanisms that give rise to diseases and malfunctions. The evolutionary medicine approach has provided insights into why diseases occur at all and additionally has produced valuable insights on treatment strategies. This course will examine a variety of diseases using an evolutionary perspective, including infectious diseases, mental disorders and cancers, and focus attention on the role of diet and psychosocial stress in the development and progression of cardiovascular disease, obesity, and diabetes.

Expanded Course Description: This is a science group satisfying course that is designed to be a comprehensive introduction to evolutionary, or Darwinian, medicine. In brief, evolutionary medicine is the application of evolutionary thinking, including evolutionary processes and human evolutionary history, to understanding health and disease among contemporary human populations. This course uses a scientific approach, drawing on the methods, theories, and bodies of knowledge from various scientific disciplines, including evolutionary biology, genetics, neuroscience, physiology, nutritional sciences, and medicine.

This course has four main sections:

**Section 1** introduces students to the scientific method and evolutionary theory, and builds the foundation for the understanding the evolutionary medicine approach. Particular attention is directed towards the adaptation concept and life history theory. This section of the course also provides an introduction to human evolutionary history, concentrating on key events in hominin evolution (e.g., bipedalism and brain evolution), and to modern human biological variation.

**Section 2** focuses on the basic principles of evolutionary medicine, and emphasizes differences between proximate and ultimate explanations. This section of the course also provides a basic introduction to epidemiology (the study of patterns of human disease and their causes) and a brief discussion of contemporary global health issues.
Section 3 uses the evolutionary medicine approach to examine infectious diseases. This section of the course provides an introduction to human defenses to infectious organisms, and describes major cultural transitions in human history that altered exposure to infectious disease. This section also focuses on emerging infectious diseases.

Section 4 applies the evolutionary medicine approach to chronic diseases, including cancers and osteoporosis. This section of the course emphasizes cardiovascular diseases (heart disease and stroke), obesity, and diabetes and uses a biocultural framework to examine the role of diet and psychosocial stress in the development and progression of these conditions.

LEARNING OBJECTIVES
After successful completion of this course, students will have an understanding of the following key issues:

- The basic principles of evolutionary biology and human genetics
- The major trends in hominin evolution and how humans have adapted biologically to their environments
- The distinction between proximate and ultimate explanations for human biology and disease
- The general pattern of health change throughout human prehistory and history, and across populations
- How the biocultural approach to health can provide a window onto such issues as obesity, cardiovascular disease, type 2 diabetes, birth complications, HIV/AIDS, autoimmune diseases, and allergy
- The explanatory framework that the environmental mismatch approach uses to explain chronic disease, infectious conditions, and mental disorders in contemporary human populations

Accommodations: Appropriate accommodations will be provided for students with documented disabilities. If you anticipate needing accommodations in this course, please make arrangements to meet with me soon.

Expectations and Grading: Attendance at lectures and participation in lab sections are expected. Course readings are essential to passing exams, completing lab assignments, and participating in lab section activities. Your grade in the course will reflect performance on midterm and finals, four quizzes, 5 lab write-ups, and one response paper.

Quiz 1 (online; end of week 3) 5%
Quiz 2 (online; end of week 4) 5%
Midterm Exam (in class; 11/2) 25%
Quiz 3 (online; end of week 8) 5%
Quiz 4 (online; end of week 9) 5%
Final Exam (in class; 12/7) 25%
Response Paper (choose 1 of the 2 options) 10%
Lab Exercises (5 short lab write-ups @ 4% each) 20%

Grades will be assigned as follows: A = 90-100%, B = 80-89%, C = 70-69%, D = 60-69%, F < 60% (with minus and plus grades assigned at appropriate cutoffs).

The grading system used in this course is as follows:
A – Outstanding performance relative to that required to meet course requirements; demonstrates a mastery of course content at the highest level.
B – Performance that is significantly above that required to meet course requirements; demonstrates a mastery of course content at a high level.
C – Performance that meets the course requirements in every respect; demonstrates an adequate understanding of course content.
D – Performance that is at the minimal level necessary to pass the course but does not fully meet the course requirements; demonstrates a marginal understanding of course content.
F – Performance in the course, for whatever reason, is unacceptable and does not meet the course requirements; demonstrates an inadequate understanding of the course content.
**Required Readings:** Assorted articles and book chapters (see below)

**Canvas:** The Canvas site for this class will be your main source for course information, documents, and announcements. Make sure that you check your Canvas-linked e-mail account every day.

The midterm and final exams will cover lectures, readings, videos, and lab section material. Exams will include multiple choice, matching, and short answer (2-3 sentences) sections. The final exam will be cumulative, but will emphasize material from the second half of the course. Exams and assignments must be taken/turned in at the scheduled time—under no circumstances will make-up exams or assignment extensions be given without a documented excuse (e.g., signed note from your doctor). If you will not be able to take an exam or turn in an assignment, you must notify me in advance (preferably by e-mail).

During the term, each student will write one short (3-4 page, double spaced) response paper on an article or movie provided by the instructor. This response paper will provide an opportunity for discussion and critical analysis of current topics related to evolutionary medicine and global health. Reaction papers are only 3-4 pages long so writing should be concise and focused around a couple of main points. **Response paper choices (Choose only one):**

1) **Global health partners? HIV/AIDS, academia, and the rise of global health.** Based on article, “Unequal ‘partners’: AIDS, academia, and the rise of global health” by Johanna T. Crane. **DUE: 10/28 @ 4 pm.**

2) **HIV/AIDS: Identifying and Surviving a Plague.** Based on one (or both, if you wish) of the following movies: *And the Band Played On* (1993, HBO Films) OR *How to Survive a Plague* (2012, MPI Media). **DUE by 11/11 @ 4 pm.**

**CHEDULE:**

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<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
<th>Required Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>9/28</td>
<td>Course Overview and Requirements</td>
<td>1) Shubin 2009&lt;br&gt;2) Gibbons 2009&lt;br&gt;3) Zimmer 2015</td>
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<tr>
<td></td>
<td>9/30</td>
<td><strong>Anthropology, Science, &amp; Evolution:</strong> Anthropology; Scientific Method; Early Evolutionary Studies</td>
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<td><strong>Lab 1:</strong> Intro; Scientific Method; Basic &amp; Applied Science <strong>(Lab write-up due in lab the following week)</strong></td>
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<td>10/5</td>
<td><strong>Video Segment: Evolution—Darwin’s Dangerous Idea</strong> (Dr. Snodgrass in Las Vegas at the NACADA advising conference)</td>
<td>1) Jurmain et al. 2011 (Ch3)&lt;br&gt;Lab 2: Video: Ghost in Your Genes</td>
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<td>10/7</td>
<td><strong>Evolutionary Biology, Part 1:</strong> Natural Selection &amp; Adaptation; How Evolution Works; Biological Basis of Life</td>
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| 3    | 10/12  | **Evolutionary Biology, Part 2**: Modern Synthesis; Adaptation; Evolution and Development | 1) Stanford et al. 2008 (Ch5)  
2) Gluckman & Hanson 2006 (Ch2) |
|      | 10/14  | **Evolutionary Biology, Part 3**: Human Evolutionary History             | 1) Gluckman et al. 2009 (Ch6)                                                   |
|      |        | **Lab 3: Evolutionary Theory**                                           | **(Lab write-up due in lab the following week)**                               |
|      |        | **Quiz on the Scientific Method & Evolutionary Biology**                 | *(Online—to be taken anytime 10/17 - 10/19; Covers everything from Weeks 1-3)** |
| 4    | 10/19  | **Evolutionary Biology, Part 4**: Modern Human Origins; Human Adaptation and Adaptability | 1) Jurmain et al. 2011 (Ch12)                                                    |
|      | 10/21  | **Basics of Evolutionary Medicine**: Proximate vs. Ultimate Explanations; The Biocultural Perspective | 1) Zuk 2007 (Ch1)  
2) Randall 2012                                                                   |
|      |        | **Lab 4: Anthropometry (Body size, proportions, and composition) & biomarkers/disease markers** | **(Lab write-up due in lab the following week)**                               |
|      |        | **Quiz on Evolutionary Biology & Human Evolution**                       | *(Online—to be taken anytime 10/24 - 10/26; Covers everything from Weeks 1-4)** |
| 5    | 10/26  | **Evolutionary Medicine Case Study**: Cold Adaptation & Chronic Disease—Dr. Snodgrass’ Research in Siberia | 1) Leonard et al. 2009                                                         |
|      | 10/28  | **Epidemiology & The Big Picture of Global Health**: Trends & Historical Patterns; Epidemiological Transitions; Health Disparities; *Video Segment: Trends in Life Expectancy* | 1) Relethford 2010 (Ch17)                                                       |
|      |        | **Response Paper Option #1 (DUE by 10/28 @ 4 pm)**                      | Global health partners? HIV/AIDS, academia, and the rise of global health        |
|      |        | **Lab 5: Food Production; Skeletal Health/Paleopathology**               | **(Lab write-up due in lab the following week)**                               |
| 6    | 11/2   | **Midterm Exam**                                                       | *(In Class—Covers everything from Weeks 1-4)**                                  |
|      | 11/4   | **Allergy & Autoimmune Disease**: Changing Worlds & the Price of Victory over Infectious/Parasitic Disease | 1) Zuk 2007 (Ch2)  
2) O’Rourke 2013 (Readings not covered on the midterm)                           |
<p>|      |        | <strong>Lab 6: Video—Typhoid Mary: The Most Dangerous Woman in America</strong>      |                                                                                  |</p>
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2) Gottlieb n.d. (Vitamin A)  
1) Zuk 2007 (Ch10) |
|      | 11/11     | Emerging Infectious Diseases: Invulnerability Turns to Fear & Pessimism; The Third Epidemiological Transition | Lab Readings:  
Couzin-Frankel 2009  
Specter 2011  
Wilson 2007  
Kaiser 2013  
Healy & Paulson 2015 (Read at least 2) |
|      | 11/11     | Response Paper Option #2 (DUE by 11/11 @ 4 pm)  
Lab 7: Discussion: Current Issues in Public Health (Public Health vs. Individual Rights: Vaccination & Quarantine) | |
| 8    | 11/16     | Sexually-Transmitted Diseases: Humans in Comparative Perspective; Video segment: Evolution: Why Sex? | 1) Zuk 2007 (Ch5)  
2) Perlman 2013 (Ch8) |
|      | 11/18     | Evolution of the Human Diet: The Human Diet in Evolutionary Perspective; The Nutrition Transition | 1) Wiley 2015 (Ch28) |
|      |           | Lab 8: Physical Activity & Diet  
**(Lab write-up due in lab the following week)** | |
|      |           | **Quiz on material since the midterm (Online—to be taken anytime 11/21 - 11/23; Covers everything but emphasizes Weeks 6-8)** | |
| 9    | 11/23     | Obesity and Cardiovascular Disease: Obesity; The Obesogenic Environment; Diet & Physical Activity | 1) Stearns & Medzhito 2016 (Ch8)  
2) Bellsari 2013 |
|      | 11/25     | Cancer: The Cancer Lottery; Novel Environments & Cancers of the Reproductive System | 1) Stearns & Medzhito 2016 (Ch6) |
|      |           | No Labs—Thanksgiving Holiday! | |
|      |           | **Quiz on material since the midterm (Online—to be taken anytime 11/28 – 11/30; Covers everything but emphasizes Weeks 6-9)** | |
| 10   | 11/30     | Stress and Health: The Effects of Chronic Stress on Disease Risk; Stress and Poverty | 1) Sapolsky 2005  
2) Tough 2011 |
|      | 12/2      | Mental Disorders: Novel Environments, Anxiety, and Depression; Self-Injury; How to Live a Long and Healthy Life | 1) Stearns & Medzhito 2016 (Ch9)  
2) Dunn 2011 (Ch9) |
|      | 12/7      | **Final Exam, Monday, December 7, 2:45-4:45**  
(In Class [in the regular classroom!]—Cumulative but emphasizes material from weeks 6-10)** | |
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Fall Quarter 2015

**Required Readings**

**Week 1 Readings**


**Lab readings for week 1**

- Bering J. 2012. How are they hanging? This is why they are. In: *Why is the Penis Shaped Like That?...And other Reflections on Being Human*. *Scientific American/FSG*, pp. 3-10.

**Week 2 Reading**


**Week 3 Readings**


**Lab reading for week 3**


**Week 4 Readings**


- Randall DK. 2012. The evolutionary mistake that chokes millions of people in their sleep every night. *Slate*; 8/13/12.

**Week 5 Readings**


**Week 6 Readings**

- O’Rourke M. 2013. What’s wrong with me? I had an autoimmune disease then the disease had me. The New Yorker (8/26/13), pp. 32-37.

**Week 7 Readings**


**Lab readings for week 7 (Read at least two):**


**Week 8 Readings**


**Week 9 Readings**


**Week 10 Readings**

- Dunn R. 2011. We were hunted, which is why all of us are afraid some of the time and some of us are afraid all of the time (Chapter 9). In: The Wild Life of Our Bodies: Predators, Parasites, and Partners that Shape Who We Are Today. Harper Collins Publishers. pp. 143-154.