

ANT3930
Evolutionary Medicine
Spring 2015

Wednesday 9:35-10:25
Friday 9:35-11:30

Location: 2305 Turlington Hall

Dr. Alyson Young
Office: 425 Grinter Hall
Office hours: Thursdays 2-4 pm
Email: alys.yng@ufl.edu
Course website: <https://lss.at.ufl.edu/>

Course Description

This course explores Darwinian medicine and the application of modern evolutionary theory to understanding health and disease among contemporary human populations. Evolutionary insight is yielding important advances in understanding the nature of disease and evolutionary approaches are becoming widely used for both disease surveillance and control. This course focuses on the principles of evolutionary medicine and emphasizes the difference between proximate and ultimate explanations of disease patterns and how these different explanations shape our view of human health.

This course will cover a diverse range of themes related to evolutionary medicine including:

- Human adaptation vs. human adaptability: Constraints, trade-offs, and competition
- Evolution of pathogens, parasites, and virulence
- Human immune function and other protective mechanisms
- “Diseases of civilization” or past environments and their impact on modern patterns of health and illness
- The role of evolution in shaping reproduction, childbirth, and young child health
- The neurobiology of stress and its long term impacts on health and function
- Evolutionary components of emotion, addiction, and mental health

Required text:

2013 R.L. Perlman. *Evolution & Medicine*. Oxford University Press.
(Available in hard copy and Kindle format from Amazon)

Additional readings provided electronically.

Course Requirements and Grading

Grades are based on a total of 200 points. Point totals are calculated based on attendance, leading and participating in discussions and weekly activities and the class research project. At any point, you can calculate your grade in the course by dividing your points received by the total number of points for assignments thus far. There is no curve in this class.

Wednesdays will be lecture days. I will cover the basics of each topic and clarify any questions about the material for the week. All readings for class should be complete before class on Wednesday. Fridays will be discussion/activity days. Friday's class will usually be divided into a 45-minute discussion of the readings and a 45-minute activity related to the topic for the week.

Class Participation (75 pts.): I expect students to attend each class meeting and to take an active part in class discussions and weekly activities. Participation includes attendance, leading and participating in discussion, and group activities. I will evaluate your participation based on the *quality* of your contributions, not simply on how often you speak in class. The purpose of evaluating your participation is to encourage you to prepare for class and to promote thoughtful analysis and discussion.

- Leading discussion (10 points): Each week, 3-4 students will lead discussion on the readings for the week. Each student in the class is expected to lead *one* discussion during the semester.
- Attendance/participation (15 points): Attendance and participation will be based on weekly attendance at Wednesday

lecture sessions and participation in Thursday discussions in weeks 2-8, 10-11.

- Participation in weekly activities (50 points): Activity points will be awarded for participation in weekly “labs” in weeks 2-8 and 10-11 as well as poster feedback sessions in weeks 13-15. Students can miss one activity session without penalty.

Research Poster and Presentation (125 pts):

You will be required to present a research project on a topic of your choice that relates to evolutionary medicine. In lieu of the typical research paper, you will present a poster detailing the results of your research. Development of the research project is iterative and occurs throughout the semester:

- 1) **Research topic (25 pts):** You are required to submit a poster proposal outlining the topic of your research project by; this brief proposal should describe the topic, including why the topic is important, and should identify some of the key questions or issues your project will explore.
- 2) **Abstract and annotated bibliography (50 pts):** A 250-300 word proposal abstract (25 pts.), and an annotated bibliography (25 pts.) with at least 10 carefully selected references from scholarly literature are due March 1.
- 3) **Poster draft submission and research presentation (25 pts.):** You must submit a final draft of your poster (electronically) by **March 29**. Students will formally present their poster between March 30-April 17. All students are expected to attend the poster sessions. Students that are not presenting will be providing written feedback on student posters.
- 4) **Final poster and revision summary (25 pts):** An electronic version of the final poster and a one-page summary of the changes made based on peer feedback are due **April 24**.

Grades

Final grades will be based on the following scale: A (94-100), A- (90-93.99), B+ (87-89.99), B (84-86.99), B- (80-83.99), C+ (77-79.99), C (74-76.99), C- (70-73.99), D+ (67-69.99), D (64-66.99), D- (60-63.99), E (<59.99). Grades are awarded on the basis of points received in the class and are not curved or rounded up.

Policy on Late Assignments

You are required to complete all assignments by the stated due dates. Late assignments will lose one half-letter grade for each day past the deadline. There are no make-up opportunities for any assignment, as you will have ample time to complete each requirement. I will not assign grades of “incomplete” except in the most unusual, extreme circumstances (i.e. alien abduction). You must provide documentation of such circumstances from an appropriate authority.

Academic Honor Code

Students are expected to uphold the Academic Honor Code of the University of Florida. The Academic Honor Code is based on the premise that each student has the responsibility (1) to uphold the highest standards of academic integrity in the student's own work, (2) to refuse to tolerate violations of academic integrity in the University community, and (3) to foster a high sense of integrity and responsibility on the part of the University community. Please see the following website for a complete explanation of the Academic Honor Code: www.registrar.ufl.edu/catalog/policies/students.html.

Americans with Disabilities Act

Students with disabilities, who need reasonable modifications to complete assignments successfully and otherwise satisfy course criteria, are encouraged to meet with the instructor as early in the course as possible to identify and plan specific modifications. Students requesting accommodation must first register with the Dean of Students Office and then provide documentation to the instructor. For more information about services available to University of Florida students:

Dean of Students Office Disability Resource Center

202 Peabody Hall or 0020 Reid Hall

Phone: (352) 392-1261 Phone: (352) 392-8570

University of Florida Counseling Services

Resources are available on-campus for students that feel like they are struggling in their personal or academic life. These resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling
- Student Mental Health, Student Health Care Center, 392-1171, personal counseling

- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Course Schedule, Readings, and Assignments

This is a preliminary schedule of topics and readings. The syllabus is a guide for the course and may be subject to change with advance notice. Students are expected to complete the readings for a particular class before that class begins.

Date	Topic	Readings	Assignments
Week 1 (Jan 7-9)	Course introduction		
Week 2 (Jan 12-16)	Evolution and Medicine	Perlman Ch 1; Gluckman et al. 2011; Ulijaszek 1997	
Week 3 (Jan 19-23)	Human demography, history & disease	Perlman Ch 2; Harshman & Zera 2007; Gould & Lewontin 1979; Bribiescas and Ellison 2008	Research topic due January 25
Week 4 (Jan 26-30)	Evolutionary genetics	Perlman Ch 3, 4; Kidd & Kidd 2008	
Week 5 (Feb 2-6)	Evolutionary biology of aging	Perlman Ch 5; Austad & Finch 2008; Gluckman et al. 2008	
Week 6 (Feb 9-13)	Host/pathogen co- evolution	Perlman Ch 7, 8; Bergstrom & Feldgarden 2008	
Week 7 (Feb 16-20)	Gene-culture coevolution	Perlman Ch 9, 10; Wiley 2008; Rook et al 2008;	
Week 8 (Feb 23-27)	Stress and health	Flinn 2008; Sapolsky 1996; Nepomnaschy and Flinn 2009	Abstract and annotated bibliography due March 1
Week 9 (Mar 2-6)	<i>Spring Break</i>		
Week 10 (Mar 9-13)	“Diseases of Civilization” and health disparities	Perlman Ch 11; Turner et al. 2008; Ewald 2008; Lieberman 2008	
Week 11 (Mar 16-20)	Cancer	Perlman Ch 6; Greaves 2008; Strassman 1999	
Week 12 (Mar 23-27)	<i>SfAA Meetings</i>		Poster draft due March 29
Week 13 (Mar 30-Apr 3)	Research presentations (1-9)		
Week 14 (Apr 6-10)	Research presentations (10-19)		
Week 15 (Apr 13-17)	Research presentations (20-30)		
Week 16 (Apr 20-22)	Class wrap-up		Final electronic poster and revision summary due April 24

Additional readings

Austad, S. and C. Finch (2008) The evolutionary context of human aging and degenerative disease. In *Evolution in Health and Disease* (2nd ed.) Edited by S. Stearns and J. Koella. Oxford University Press. Pp. 301-311.

Bergstrom, C. and M. Feldgarden (2008) The ecology and evolution of antibiotic resistant bacteria. In *Evolution in Health and Disease* (2nd ed.) Edited by S. Stearns and J. Koella. Oxford University Press. Pp. 125-137.

Bribiescas, R. and P. Ellison (2008) How hormones mediate trade-offs in human health and disease. In *Evolution in Health and Disease* (2nd ed.) Edited by S. Stearns and J. Koella. Oxford University Press. Pp. 77-92.

Flinn, M. (2008) Why Words Can Hurt Us: Social Relationships, Stress and Health. In *Evolutionary Medicine and Health*. Edited by W. Trevathan, E.O. Smith, and J.J. McKenna. Oxford University Press. Pp. 242-258.

Gluckman, P., A. Beedle, and M. Hanson (2008) Evolution of life Histories. In *Principles of Evolutionary Medicine*. Oxford University Press. Pp. 257-276.

Gluckman, P., Low, F., Buklijas, T., Hanson, M., and A. Beedle (2011) How evolutionary principles improve the understanding of human health and disease. *Evolutionary Applications* 4(2): 249-263.

Gould, S. J. and R. C. Lewontin (1979) The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme *Proc. R. Soc. Lond.* (205)1161: 581-598.

Greaves, M. (2008) Cancer: evolutionary origins of vulnerability. In *Evolution in Health and Disease* (2nd ed.) Edited by S. Stearns and J. Koella. Oxford University Press. Pp. 277-287.

Harshman, L. and A. Zera (2007) The cost of reproduction: the devil in the details. *Trends in Ecology and Evolution*, 22(2): 80-86.

Rook, GA., Lowry, C. and C. Raison (2013) Microbial ‘Old Friends’, immunoregulation and stress resilience. *Evolution, Medicine, and Public Health*, pp. 46-64.

Sapolsky, R. (1996) Why stress is bad for your brain. *Science*, 273(5276):749-50.

Strassman, B. (1999) Menstrual cycling and breast cancer. *Journal of Women's Health*. 8(2): 193-202.

Turner, B., K. Maes, J. Sweeney, and G. Armelagos (2008) Human evolution, diet, and nutrition: When the body meets the buffet. In *Evolutionary Medicine and Health*. Edited by W. Trevathan, E.O. Smith, and J.J. McKenna. Oxford University Press. Pp. 55-71.

Ulijaszek, S. (1997) Human adaptation and adaptability. In *Human Adaptability: Past, Present, and Future*. Edited by S. Ulijaszek and R. Huss-Ashmore. Oxford University Press. Pp. 7-16.

Wiley, A. (2008) Cow’s milk consumption and health: An evolutionary perspective. In *Evolutionary Medicine and Health*. Edited by W. Trevathan, E.O. Smith, and J.J. McKenna. Oxford University Press. Pp. 116-133.