

**EVOLUTION OF THE HUMAN BRAIN (ANTH 3413)  
SPRING 2017**

**Instructor:** Dr. Chet Sherwood  
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Email: sherwood@gwu.edu  
Office Hours: Wednesdays, 2:00 – 4:00 pm or by appointment

**Class Hours and Location:** Monday & Wednesday, 12:45 – 2:00 pm  
Bell Hall, room 107

**Texts:**

- *Evolving Brains* (1999) John M. Allman, Scientific American Press
- Book chapters and articles to be posted to Blackboard

**COURSE SYLLABUS**

**Course description:** In this course, we will examine how the human brain is unique in comparison to other animals, with an emphasis on understanding our species' distinctive neurobiology in relation to the evolution of cognitive abilities such as language, social comprehension, tool making, and abstract thinking. We will survey functional systems in the brain, highlighting current knowledge on phylogenetic variation in connectivity, neocortical diversification, differences in neurotransmitter systems, and evidence from fossil endocasts. The course will also entail discussion of recent theoretical developments in the study of primate neural adaptations and how they relate to socioecological selective pressures. Finally, we will explore how these issues intersect in the evolution of the human brain.

**Learning objectives:** At the end of this course, students will: (1) know the mechanisms of evolutionary change in brain structure and function, (2) be able to identify the features of the mind and brain that are unique to humans and other primates, (3) critically evaluate the various empirical studies and theoretical arguments in the current scientific literature pertaining to human brain evolution, and (4) synthesize this knowledge to develop new questions about the evolution of the human brain.

**Course requirements:** Your final course grade will be based on the following work:

1. Quiz #1 on basic neuroanatomy and neuronal physiology. This quiz is worth **10 points**.
2. Brain, behavior, and evolution news update. During each class, students will present a 3-minute update on a recent research finding concerning brain, behavior, evolution, and/or science policy. This assignment is worth **5 points**.
3. Journal club and video discussions. In addition to the regular reading assignments, several times during the semester you will also be responsible to either read one additional journal article from the primary scientific literature or to watch assigned videos from science TV specials or lectures on the Internet. The assignments will be made available during the prior week on the course's Blackboard site. On these occasions, we will hold a "journal club" or "video discussion" during class time. This will involve small group discussion of the assignment, with an emphasis on critically evaluating the merits and shortcomings of the methods, findings, or interpretations presented. During these weekly discussion sessions, several questions will be posed which you will respond to in writing with your small group. On the course schedule, "**JC**" indicates a day where the last 20 minutes of class will be used for this assignment. Each discussion session is worth 5 points. There will be 3 discussion sessions over the course of the semester for a total of **15 points**.
4. Quiz #2 on human brain evolution. This quiz is worth **10 points**.
5. News magazine article on human brain evolution. One assignment will be written in the style of a news magazine article (e.g., *Scientific American*, *Discover*, *National Geographic*). Over the course of the semester, we will identify 2 scientists that are leaders in the study of human brain evolution and we will

arrange interviews with them during class time over Skype. Students will take notes from the interviews, and in combination with information learned in lectures and readings from the course, write a 4-page, single-spaced, news magazine article. This assignment is worth **20 points**.

6. Mock grant proposal. As a final assignment, you will write a mock grant proposal to address a topic of your choice concerning evolution of the brain or behavior. This written assignment is worth **25 points** of your final grade. The proposal will be 5 pages, single-spaced and address the following questions:
  - a. Concise statement of your research objectives, or the specific questions to be answered.
  - b. Description of the importance of the research project to human evolutionary neuroscience.
  - c. Brief history of attempts to answer the same or related questions by other researchers.
  - d. Detailed explanation of the information needed to answer the research question(s) and your methods (how you plan to gather this information).
  - e. Summary of any broader implications or your future goals relevant to proposed research.
7. Presentation. During the last week of class, we will hear brief oral presentations of mock research proposals from each student. This oral presentation is worth **5 points** of your final grade.
8. Debates in evolutionary neuroscience. From April 10-19, the course will culminate in a series of organized debates. Earlier in the semester, students will identify 4 current controversies or unresolved issues in evolutionary neuroscience and propose topics for debates. Readings on these topics will be assigned for everyone in the class. During each “debate” class session, one group of students will argue the case “for” and another group will argue the case “against”, using PowerPoint slides to make a 20-minute presentation. Additional students will be assigned to serve as moderators of these debates and will prepare questions for each side. This assignment is worth **10 points** – broken down as 7 points for your group’s presentation and 3 points for your role as a moderator.

\* It is expected that each week students will commit approximately 150 minutes to in-class instruction, plus 300 minutes to independent learning.

## SCHEDULE OF TOPICS

*(subject to change)*

WEEK	TOPIC	READINGS
January 18	Introduction and organization of the course	
January 23 January 25	The history of studying and comparing brains A crash course in evolutionary theory	EB: Chapters 1-2
January 30 February 1	Anatomy and physiology of cells in the nervous system Brain organization: the blueprint	EB: Chapters 3-4
February 6 February 8	Evolutionary changes in overall brain size Hands-on lab session	Articles on Blackboard
February 13 February 15	<b>February 13 – Quiz #1</b> Evolutionary changes in brain region size & structure	Articles on Blackboard
February 20 February 22	Research presentation by Dr. Aida Gomez-Robles ( <b>JC</b> ) Laboratory Demonstration	Articles on Blackboard
February 27 March 1	What's special about mammal & primate brains? What's special about human brains?	EB: Chapters 5-7
March 6 March 8	The fossil record of human brain evolution (Interview for News Magazine Article this week) ( <b>JC</b> )	Articles on Blackboard
March 13 -17	SPRING BREAK – NO CLASSES	
March 20 March 22	The evolution of human brain development and aging Microstructural and molecular aspects of human brain evolution	Articles on Blackboard
March 27 March 29	The lopsided human brain (Interview for News Magazine Article this week) ( <b>JC</b> )	Articles on Blackboard
April 3 April 5	The co-evolution of language and the brain Research presentation by Dr. Nicky Staes	Readings posted on Blackboard
April 10 April 12	<b>April 10-12 – Debates in evolutionary neuroscience</b> <b>April 12 – News magazine article is due</b>	Articles on Blackboard
April 17 April 19	<b>April 17-19 – Debates in evolutionary neuroscience</b>	Articles on Blackboard
April 24 April 26	<b>April 24-26 – Student presentations</b>	Articles on Blackboard
May 1	<b>May 1 – Quiz #2</b>	
May 8	<b>May 8 – Mock grant proposal is due</b>	

**Academic integrity:** All graded work must be completed in accordance with The George Washington University Code of Academic Integrity, available online: <http://www.gwu.edu/~ntegrity/code.html>

**Support for students outside of the classroom:**

Disability Support Services (DSS). Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information, please refer to <http://gwired.gwu.edu/dss/>

University Counseling Center (UCC). The Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations; and confidential assessment, counseling services (individual and small group), and referrals. You can reach the UCC at 202-994-5300. For additional information, please refer to <http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices>

**Security:** In the case of emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After the evacuation, seek shelter at a predetermined rendezvous location.