

## ANTHROPOLOGY 3334G Section 001

### Primate and Human Paleontology

University of Western Ontario

January 2012

**Class Time:** W 7:00-9:50 PM  
**Instructor:** Dr. Ian Colquhoun  
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**TA's Office Hours:**

#### Course Description:

The aim of this course, as the title suggests, is to introduce you to the study of the primate fossil record and the evolution of the Order Primates. Of course, our species, *Homo sapiens*, is a member of this diverse mammalian order (in the Class Mammalia, only the Order Rodentia, the rodents, and the Order Chiroptera, the bats, contain more species than the Order Primates). Thus, in order to accurately conceive of our own species in a phylogenetic context, students of anthropology should develop an understanding of how humans compare with other primate species -- our closest biologic relatives. Accordingly, this course employs both paleontological and neontological perspectives -- that is, we will consider the extinct species of the primate fossil record, as well as the major lineages of extant primates (as the latter can serve as models by which to better understand the former, but also inform us on the limits of such modelling). Achieving a thorough understanding of primate evolutionary history allows for a fuller appreciation of the biological and behavioural variability of both modern *Homo sapiens* and the other extant species of the Order Primates.

#### Required Text:

Fleagle, J.G.  
1999 *Primate Adaptation and Evolution* (2<sup>nd</sup> ed.). Academic Press, San Diego.

#### Course Requirements:

Course requirements (aside from your weekly attendance of lectures being expected) will include:

- a mid-term examination (**25%** of final grade),
- three article review exercises (@ 10% each = **30%** of your final grade),
- a final examination (**35%** of final grade),
- discussion session participation (**10%** of final grade).

The format of the exams will include true/false, multiple choice, fill-in-the-blank and short answer questions. Material covered on the exams will come from lectures, text readings, discussion sessions, and supplementary discussion group readings, **but lecture and discussion material will be emphasized**. Be advised, lectures will include material that is **not** covered in the course text (a good reason to always attend class!).

## Course Outline (tentative):

- Wed. Jan. 11: Introduction: Species concepts and forms of selection. Reading: Fleagle, chapter 1.
- Wed. Jan. 18: Issues in primatology and primate evolution: How can the primates be defined?. Readings: Fleagle, chapters 3 & 9.
- Wed. Jan. 25: Primate origins — the Cretaceous and early Tertiary. Readings: Fleagle, chapter 10 & 11.
- Wed. Feb. 1: Modern prosimians: the “lower” primates. Readings: Fleagle, chapter 4.  
*Supplemental readings:*  
Groves, C. & Shekelle, M., 2010. The Genera and Species of Tarsiidae. *International Journal of Primatology* **31**: 1071-1082 (journal available electronically via [www.lib.uwo.ca](http://www.lib.uwo.ca) );  
Horvath, J.E. et al., 2008. Development and application of a phylogenetic toolkit: Resolving the evolutionary history of Madagascar’s lemurs. *Genome Research* **18(3)**: 489-499 (early online version available at: [www.biology.duke.edu/yoderlab/reprints/2008Horvath\\_etalGR.pdf](http://www.biology.duke.edu/yoderlab/reprints/2008Horvath_etalGR.pdf) );  
Merker, S. et al., 2009. Elucidating geological and biological processes underlying the diversification of Sulawesi tarsiers. *Proceedings of the National Academy of Sciences* **106(21)**: 8459-8464 (pdf available at: <http://user.uni-frankfurt.de/~smerker/publications.htm> );  
Yoder, A.D., 2007. Lemurs – A Quick Guide. *Current Biology* **17(20)**: R866-R868 (pdf available at: [www.biology.duke.edu/yoderlab/reprints/2007YoderCB.pdf](http://www.biology.duke.edu/yoderlab/reprints/2007YoderCB.pdf) ).
- Wed. Feb. 8: The first “euprimates”: the fossil prosimians of the Eocene. Reading: Fleagle, chapter 12.  
*Supplemental reading:*  
Seiffert, E.R., 2007. Early Evolution and Biogeography of Lorisiform Strepsirrhines. *American Journal of Primatology* **69(1)**: 27-35 (journal available electronically via [www.lib.uwo.ca](http://www.lib.uwo.ca) ).
- \*Wed. Feb. 15: **\*Mid-term exam.**
- \*\*Wed. Feb. 22: **\*\*Reading Week** – no scheduled classes!!
- Wed. Feb. 29: Modern anthropoids I: The New World and Old World monkeys. Readings: Fleagle, chapters 5 and 6. Video: “Monkeys of Hanuman”.  
*Supplemental readings:*  
Hodgson, J.A., et al., 2009. Successive radiations, not stasis, in the South American primate fauna. *Proceedings of the National Academy of Sciences* **106(14)**: 5534-5539 (pdf available at: <http://www.pnas.org/content/106/14/5534.full> );  
Raaum, R.L., et al.2005. Catarrhine primate divergence dates estimated from complete mitochondrial genomes: concordance with fossil and nuclear DNA evidence. *Journal of Human Evolution* **48**: 237-257 (pdf available at: [www.raaum.org/uploads/1/1/7/5/1175545/raaum2005p1072.pdf](http://www.raaum.org/uploads/1/1/7/5/1175545/raaum2005p1072.pdf) , or Google search “catarrhine divergence dates”);
- Wed. Mar. 7: The early fossil anthropoids of the Oligocene and Miocene. Readings: Fleagle, chapter 13, 14 and 16.  
*Supplemental readings:*  
Delson, E., 1992. Evolution of Old World monkeys; pp. 217-222 in: *Cambridge Encyclopedia of Human Evolution* (J.S. Jones, R.D. Martin, D. Pilbeam, Sara Burney, eds.). Cambridge: Cambridge University Press. (pdf available at: [http://pages.nycep.org/ed/download/pdf/Delson\\_1992.pdf](http://pages.nycep.org/ed/download/pdf/Delson_1992.pdf) ).

- Rosenberger, A.L. & Hartwig, W.C., 2001. New World Monkeys. Encyclopedia of Life Sciences: Nature Publishing Group / [www.els.net](http://www.els.net) (pdf available at: [http://pages.nycep.org/rosenberger/.../NWM\\_Rosenberger\\_Hartwig.pdf](http://pages.nycep.org/rosenberger/.../NWM_Rosenberger_Hartwig.pdf) ).
- Williams et al., 2010. New perspectives on anthropoid origins. *Proceedings of the National Academy of Sciences* **107**(11): 4797-4804 (pdf available at: <http://www.pnas.org/content/early/2010/03/05/0908320107> ).
- Wed. Mar. 14: Modern anthropoids II: The living hominoids. Readings: Fleagle, chapter 7.  
Video: *National Geographic* "The New Chimpanzees".  
*Supplemental readings:*  
Pilbeam, D. & Young, N., 2004. Hominoid evolution: synthesizing disparate data. *Comptes Rendus Palevol* **3**: 305-321 (pdf available at: [www.fas.harvard.edu/~palanth/Nate/.../pilbeam\\_young\\_2004.pdf](http://www.fas.harvard.edu/~palanth/Nate/.../pilbeam_young_2004.pdf) ).  
Thinh, V.N., et al., 2010. Mitochondrial evidence for multiple radiations in the evolutionary history of small apes. *BMC Evolutionary Biology* **10**:74 (this paper is in an Open Access journal, available at: <http://www.biomedcentral.com/1471-2148/10/74> ).
- Wed., Mar. 21: Fossil hominoids of the Miocene.  
Readings: Fleagle, chapters 15.  
*Supplemental readings:*  
Ciochon, R., 2009. The mystery ape of Pleistocene Asia. *Nature* **459**: 910-911 (available at: <http://www.nature.com/nature/journal/v459/n7249/full/459910a.html> ).  
Dalton, R., 2009. Early man becomes early ape. *Nature* **459**: 899 (available at: <http://www.nature.com/news/2009/090617/full/459899a.html> ).  
Harrison, T., 2010. Apes Among the Tangled Branches of Human Origins. *Science* **327**: 532-534 (pdf available at: [http://www.nyu.edu/gsas/dept/anthro/programs/csho/Content/Facultycvandinfo/Harrison/2010\\_Harrison.pdf](http://www.nyu.edu/gsas/dept/anthro/programs/csho/Content/Facultycvandinfo/Harrison/2010_Harrison.pdf) ).
- Wed. Mar. 28: Hominid origins. Reading: Fleagle, chapter 17.  
*Supplemental readings:*  
Callaway, E., 2011. Ancient DNA reveals secrets of human history. *Nature* **476**: 136-137 (available at: <http://www.nature.com/news/2011/110809/full/476136a.html> ).  
Gibbons, A., 2009. A New Kind of Ancestor: *Ardipithecus* Unveiled. *Science* **326**: 36-40 (pdf available from: <http://ts-si.org/files/ScienceArdi32636.pdf> ).  
Krause, J., et al., 2010. The complete mitochondrial DNA genome of an unknown hominin from southern Siberia. *Nature* – doi:10.1038/nature08976 (pdf available at: [http://www.eva.mpg.de/genetics/pdf/Krause\\_Complete\\_Nature\\_doi.pdf](http://www.eva.mpg.de/genetics/pdf/Krause_Complete_Nature_doi.pdf) ).  
Lovejoy, C.O., 2009. Reexamining Human Origins in Light of *Ardipithecus ramidus*. *Science* **326**: 74-74e8 (pdf available at: <http://www.centenary.edu/attachments/philosophy/aizawa/courses/philscif2010/lovejoyetal.2009e.pdf> ).  
O'Higgins, P. & Elton, S., 2007. Walking on Trees. *Science* **316**: 1292-1294 (journal available electronically via [www.lib.uwo.ca](http://www.lib.uwo.ca) ).  
Thorpe, S.K.S., et al., 2007. Origin of Human Bipedalism As an Adaptation for Locomotion on Flexible Branches. *Science* **316**: 1328-1331 (pdf available at: <http://www.cs.bham.ac.uk/research/projects/cogaff/talks/wonac/sue.d/Thorpe-et-al-Science-2007.pdf> ).
- Wed. Apr. 4: Patterns in primate evolution. Reading: Fleagle, chapter 18.  
*Supplemental reading:*  
Perelman, P., et al., 2011. A Molecular Phylogeny of Living Primates. *PLoS Genetics* **3**:e1001342 (*PLoS Genetics* is an Open Access journal available at: [www.plosgenetics.org](http://www.plosgenetics.org) ).
- Wed. Apr. 11: The past and future of paleoprimatology. Readings: Fleagle, J., 2000. The Century of the Past: One Hundred Years in the Study of Primate Evolution. *Evolutionary Anthropology* **9**(2): 87-100 ;  
Fleagle, J., 2002. The Primate Fossil Record. *Evolutionary Anthropology* **11**, Suppl. 1: 20-23;

Steiper, M.E. & Young, N.M., 2008. Timing Primate Evolution: Lessons from the Discordance Between Molecular and Paleontological Estimates. *Evolutionary Anthropology* **17**: 179-188 (*Evolutionary Anthropology* is available online through [www.lib.uwo.ca](http://www.lib.uwo.ca)).

**\*FINAL EXAM**; the final exam is worth **40%** of the final grade (only material covered since the mid-term will be on the test). **The exam will be written in the April exam period (i.e., Apr. 14-30)** -- specific date and time to be announced.

### **Discussion Groups and Article Review Exercises:**

Beginning January 18, lectures will run from 7:00 until @ 8:50 (with a break @ 7:50, or so). The last part of each class will see one-third of the class engaging in a discussion group every third week. Discussion groups will meet according to the following schedule:

	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>
<u>Discussion #1</u>	Jan. 18	Jan. 25	Feb. 1
<u>Discussion #2</u>	Feb. 8	Feb. 29	Mar. 7
<u>Discussion #3</u>	Mar. 14	Mar. 21	Mar. 28

The discussion group format is intended to allow us to highlight certain issues or problems that are of importance in the interpretation, understanding and reconstruction of primate adaptation and evolution. You should be sure to have read the relevant material for each discussion session (see below) before coming to class and to the discussion group so that you are prepared to discuss and comment on the material.

Each discussion will also include a short follow-up research assignment. Each follow-up research assignment will involve you searching out **three (3)** pertinent references **published since 2005** in **peer-reviewed academic journals**, and **for each peer-reviewed paper you select**, provide a 2-3 page, double-spaced **summary of its content** and **commentary** on its importance to the **study of primate adaptation and evolution**. Thus, for each discussion follow-up assignment, you will be producing an article review document that is 6-9 pages in length (i.e., three (3) peer-reviewed papers, each given a 2-3 page review).

The purpose of these assignments is to allow you to explore the primary research literature on primate adaptation and evolution more fully than is possible within the limits of our weekly class time. You will, therefore, likely find yourself using bibliographic data bases (such as Science Citation Index) in order to track down relevant articles in academic journals such as (but certainly not limited to): *American Journal of Physical Anthropology*; *Evolutionary Anthropology*; *Folia Primatologica*; *International Journal of Primatology*; *Journal of Human Evolution*; *Nature*; *Science*; *Proceedings of the National Academy of Sciences*, etc. Recent issues of all the journals just listed (as well as many other relevant journals) are available online through [www.lib.uwo.ca](http://www.lib.uwo.ca), in many cases spanning back several years. **Note: journal articles that are included in the course reading list as supplemental readings are not to be selected for these article review exercises**; not to worry, however – there is no shortage of recent fossil discoveries and comparative analyses reported in the recent paleoprimatological literature! One further hint – conducting searches with Google Scholar (or, even just a plain Google search) is, more and more, becoming a quick and efficient way of locating electronic versions of peer-reviewed journal publications. Of course, if you have any questions, drop by my office for a quick conferral (also usually quicker and more efficient than zapping e-mails back and forth!).

Each article review exercise will be graded out of 10 marks; their total value is **30%** of your final grade in the course. Reviews 1 and 2 will each be due three weeks after your discussion group meets (**i.e., at the next meeting of your discussion group**); **late submissions will be subject to a late penalty of 3 marks per class**. For all three discussion groups, review 3 will be due when the final class of the term meets (Apr. 11). The topic areas for the discussions and article review exercises are as follows (unless otherwise noted\*, discussion group readings are available online through [www.lib.uwo.ca](http://www.lib.uwo.ca)):

**Discussion #1: Allometry, Life History and Paleobiology** -- comparative primatology in the understanding of growth, development, reproduction and aging; relevant readings:

Fleagle, Chap. 9.

Cartmill, M., 2002. "Historical Explanation and the Concept of Progress in Primatology". *Evolutionary Anthropology* 11 (Supp. 1): 12-15.

Hooton, E., 1954. "The Importance of Primate Studies in Anthropology". *Human Biology* 26(3): 179-188.

Martin, R.D., 2002. "Primateology as an Essential Basis for Biological Anthropology". *Evolutionary Anthropology* 11 (Supp. 1): 3-6.

\*Schmidt-Nielsen, K., 1984. "The Size of Living Things"; "Problems of Size and Scale", and "The Use of Allometry", chapters 1-3, pp. 1-32, in: *Scaling: Why is Animal Size So Important?*, Cambridge: Cambridge U. Press (**note** -- this book is on 2-Hr Reserve at Allyn & Betty Taylor Library: **QL 799.S34**; a copy of the chapters is also in our course folder in the Anthro. Dept. Library).

\*Smith, R.J., 1985. "The Present as a Key to the Past: Body Weight of Miocene Hominoids as a Test of Allometric Methods for Paleontological Inference"; pp. 437-448 in: *Size and Scaling in Primate Biology* (W.L. Jungers, ed.), New York: Plenum Press (**note** -- this book is on 2-Hr Reserve at Allyn & Betty Taylor Library: **QL737.P9S59 1985**; a copy is in our course folder in the Anthro. Dept. Library).

Strier, K.B., 2011. "Why Anthropology Needs Primatology". *General Anthropology* – Bulletin of the General Anthropology Division (AAA – Am. Anthro. Assoc.) 18(1): 1, 6-8. (available online at: <http://onlinelibrary.wiley.com/doi/10.1111/gena.2011.18.issue-1/issuetoc> ).

**Discussion #2: Analogy and Other Reconstruction Methods** – the use, and limitations, of analogy vs. other approaches to the reconstruction of behaviour in fossil primates (or predicting behaviour of little-studied extant primates); relevant readings:

Fleagle, Chap. 10.

Dunbar, R.I.M., 1989. "Ecological Modelling in an Evolutionary Context". *Folia Primatologica* 53: 235-246.

Janson, C.H., 2000. "Primate Socio-Ecology: The End of a Golden Age". *Evolutionary Anthropology* 9(2): 73-86.

Marino, L., 1996. "What Can Dolphins Tell Us About Primate Evolution?". *Evolutionary Anthropology* 5(3): 81-85.

Stanford, C.B., 2006. "The behavioral ecology of sympatric African apes: implications for understanding fossil hominoid ecology". *Primates* 47: 91-101.

Tavare, S. et al., 2002. "Using the fossil record to estimate the age of the last common ancestor of extant primates". *Nature* 416:726-729 (April 18).

**Discussion #3: Systematics and Phylogeny** -- studying the diversity, classification and evolutionary relationships of modern and fossil primates; relevant readings:

Fleagle, Chap. 1.

Andrews, P. and Martin, L., 1987. "Cladistic Relationships of Extant and Fossil Hominoids". *Journal of Human Evolution* 16(1): 101-118.

Groves, C., 2001. "Why Taxonomic Stability Is a Bad Idea, or Why Are There So Few Species of Primates (Or Are There?)". *Evolutionary Anthropology* 10: 192-198.

Hey, J., 2006. "On the failure of modern species concepts". *Trends in Ecology and Evolution* 21(8): 447-450;

\*Ridley, M. (2004). "The Reconstruction of Phylogeny"; pp. 423-470 in *Evolution* (3<sup>rd</sup>. ed), Oxford: Blackwell Publishing (**note** -- this book is on 2-Hr Reserve at Allyn & Betty Taylor Library: **QH 366.2.R524**; a copy of the chapter is also in our course folder in the Anthro. Dept. Library).

Tattersall, I., 2007. "Madagascar's Lemurs: Cryptic Diversity or Taxonomic Inflation?" *Evolutionary Anthropology* 16: 12-23.

**Statement on Accessibility:**

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

**Statement on Academic Offences:**

Any plagiarism of ideas, data or wording (i.e., use of such previously published material without proper referencing or due acknowledgment of the original author), is a serious academic offence and will not be tolerated. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [http://www.uwo.ca/univsec/handbook/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf)

**Western Medical Accommodation Policy (Medical Notes):**

In May, 2008, The University of Western Ontario's Senate approved a new medical note policy, which affects all students. The following is an outline of that policy. For more detailed information and forms, please visit <https://studentservices.uwo.ca/secure/index.cfm>, and for further policy information please visit [http://www.uwo.ca/univsec/handbook/appeals/accommodation\\_medical.pdf](http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf)

**Documentation from Family Physicians and Walk-In Clinics:**

A Western Student Medical Certificate (SMC)\* is required where a student is seeking academic accommodation. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. An SMC\* can be downloaded under the Medical Documentation heading of the following website: <https://studentservices.uwo.ca/secure/index.cfm>. Hard copies are available from the student's home Faculty Academic Counselling Service.

**Documentation from Student Health Services:**

Students obtaining documentation from Student Health Services should sign a "release of information." This form authorizes Student Health Services to provide information to the student's home Faculty. Release of information forms are available from, and can be arranged through, the student's home Faculty Academic Counselling Service.

**Documentation from Hospital Urgent Care Centres or Emergency Departments:**

Students should request that an SMC\* be filled out. Students may bring this form with them, or request alternative Emergency Department documentation. Documentation should be secured at the time of the initial visit to the Emergency Department. Where it is not possible for a student to have an SMC\* completed by the attending physician, the student must request documentation sufficient to demonstrate that his/her ability to meet his/her academic responsibilities was seriously affected.

\*To print or see an example of the Western Student Medical Certificate (SMC) please visit <https://studentservices.uwo.ca/secure/index.cfm> and click on "Student Medical Certificate.pdf".

**Additional Statements:**

Statement on Use of Electronic Devices: Students are requested to switch off cell phones while in lecture. Students are not permitted access to cell phones during the mid-term and final exams. There will be no need for the use of calculators during either the mid-term or final exam. Electronic dictionaries, PDAs, Palm Pilots, etc., are not permitted during the mid-term or final exam. Students may use laptop computers to take notes during lecture, but only if this laptop usage is not a distraction to other students in the class -- use of a laptop by a student for purposes other than those directly related to the course (e.g., watching YouTube; exchanging messages over MSN; etc.) would be grounds for disallowing further use of the laptop in class by the student.

**Statement on Use of Personal Response Systems ("Clickers"):** "Clickers" will not be used in this course.

The above Statements are based on material that is available at:

[http://www.uwo.ca/univsec/handbook/exam/courseoutlines\\_undergrad.pdf](http://www.uwo.ca/univsec/handbook/exam/courseoutlines_undergrad.pdf)