

BAN1. HUMANS IN BIOLOGICAL PERSPECTIVE

Paper aims and objectives:

This paper provides a broad introduction to biological anthropology and covers major subject areas such as primate biology and behaviour, human evolution, human health, adaptation to different environments and life history theory. Through studying this course, students will gain a strong foundation in the field of biological anthropology and an understanding of how different approaches can be used to address specific questions about human origins and diversity. The paper begins with an introduction to non-human primates, highlighting the importance of the comparative approach for understanding evolutionary processes. We then go on to discuss human evolution, diversity and adaptation, including introductory lectures on human genetics and health. The paper concludes with a module on human growth and ecology.

Paper Coordinator: Dr Jacob Dunn (jcd54@cam.ac.uk)

General Reading:

Boyd, R. & Silk, J. (2012) *How Humans Evolved*. (6th edit). W. W. Norton & Co.
Campbell C.J. et al. (ed). (2010). *Primates in Perspective*. (2nd edit). Oxford University Press.
Dawkins, R. (1989) *The Selfish Gene*. New edit. Oxford University Press.
Fleagle, J. (2013) *Primate Adaptation and Evolution*. (3rd edit). Academic Press.
Ridley, M. (2003) *Nature Via Nurture: Genes, Experience, and What Makes Us Human*. Harper Collins
Stringer, C. & Andrews, P. (2011) *The complete world of Human Evolution*. 2nd edition. Thames & Hudson
de Waal, F. (2001) *Tree of Origin. What Primate Behavior Can Tell Us about Human Social Evolution*. Harvard University Press.

Lecture Room:

Lecture Room 4, 8 Mill Lane, Cambridge, CB3 1RX

Map: <http://map.cam.ac.uk/Mill+Lane+Lecture+Rooms#52.201606,0.117313,18>

Lecture Times:

Michaelmas, Lent and Easter Terms (Tuesday 9am, Wednesday 11am)

First Lecture Tuesday 14th October

Syllabus:

This paper is about the relationships between the biology, ecology and behaviour of our own species. The paper first places humans in a broad evolutionary framework by exploring the order Primates. During these lectures, we highlight the importance of the comparative method advocated by Charles Darwin (comparing homologous traits across a wide range of different species to draw general inferences about their evolution) for understanding evolutionary processes. The paper then explores our more recent evolutionary history in more detail. Firstly, we ask what it means to be human from a genetic point of view. Principles and evolutionary mechanisms that generate and shape genetic variation are presented, explaining how inferences from observed patterns of diversity within and among human populations are made. In the following lectures, hominin evolutionary history is discussed in more detail, with a focus on the evolution of human diversity. Then, human adaptation is introduced more broadly, with reference to the interactions between our biology and our behaviour. Finally, growth, ecology and disease are discussed, with a focus on modern human populations.

Michaelmas Term

The Scope of Biological Anthropology

Dr Peter Walsh

An introduction to the breadth and scope of research in the field of biological anthropology

One lecture, 14 Oct

Primate Biology

Dr Jurgi Cristóbal-Azkarate

In this series of four lectures, we will explore the origin, evolution, diversity, anatomy and reproductive biology of non-human primates.

Four lectures, beginning 15 Oct

Readings:

Mittermeier et al. (eds). (2014). Handbook of the Mammals of the World-Volume 3. Primates. Lynx Edicions.

Campbell C.J. et al. (ed). (2010). Primates in Perspective. (2nd edit). Oxford University Press.

Fleagle, J. (2013) Primate Adaptation and Evolution. (3rd edit). Academic Press.

Dixon, A. (2012). Primate Sexuality (2nd ed.). New York: Oxford University Press.

Primate Behaviour

Dr Jacob Dunn

This module will provide an introduction to primate behaviour. During lectures we will discuss reproductive behaviour and rearing offspring, growing up and survival, the regulation of social relationships, and communication.

Four lectures, beginning 29 Oct

Readings: (specific reading lists will be given for each lecture)

Mitani, J. et al. (eds). (2013). The evolution of primate societies. University of Chicago Press.

Campbell C.J. et al. (ed). (2010). Primates in Perspective. (2nd edit). Oxford University Press.

Strier, K. (2010). Primate behavioral ecology. (4th edit). Pearson Press.

Cognition and Social Networks

Dr Peter Walsh

Shakespeare? Calculus? Facebook? Surely complex cognitive skills must be uniquely humans? And must not unique cognitive skills translate into uniquely human social network dynamics? Well, maybe not. In this module we investigate the evolutionary roots of human cognition and the role of evolutionary ancient cognitive mechanisms in structuring human social systems.

Five lectures, beginning 12 Nov

Readings:

R. I. M. Dunbar. (2014). The Social Brain: Psychological Underpinnings and Implications for the Structure of Organizations. *Current Directions in Psychological Science* 23:109-114.

C. P. van Schaik, et al. (2012). Explaining brain size variation: from social to cultural brain. *Trends in Cognitive Sciences* 16:277-284.

A.G. Rosati, et al. (2014). The ecology of spatial memory in four lemur species. *Animal Cognition* DOI 10.1007/s10071-014-0727-2

A. J. W. Ward, et al. 2008. Quorum decision-making facilitates information transfer in fish shoals. *PNAS* 105: 6948-6953.

I. D. Couzin, et al. 2012. Uninformed Individuals Promote Democratic Consensus in Animal Groups. *Science* 334:1578-1580.

R. M. Bond, et al. 2012. A 61-million-person experiment in social influence and political mobilization. *Nature* 489:295-298.

D. Centola. 2011. An Experimental Study of Homophily in the Adoption of Health Behavior. *Science* 334:1269-1272.

- S. Davis, et al. 2008. The abundance threshold for plague as a critical percolation phenomenon. *Nature* 454:634-637.
- D. T. Haydon, et al. 2006. Low-coverage vaccination strategies for the conservation of endangered species. *Nature* 443:692-695.
- A. M. Roberts & S. K. S. Thorpe. 2014. Challenges to human uniqueness: bipedalism, birth and brains. *Journal of Zoology* 292: 281–289.

Ape Conservation

Dr Peter Walsh

Our closest relatives (gorillas, chimpanzees, and orangutans) are rapidly disappearing from the wild. This module reviews the state of the apes and gives a first person account of what and who has worked in ape conservation; from Jane Goodall and Dian Fossey to current private sector conservation programs and high tech solutions.

Two lectures, beginning 2 Dec

Readings:

Walsh, P.D. et al. 2003. Catastrophic ape decline in western equatorial Africa. *Nature* 422:611-614.

W. M. Ahebwa, et al. Private-community Partnerships: Investigating a New Approach to Conservation and Development in Uganda. *Conservation and Society* 10:305-317.

Hodgkinson, C. 2009 Tourists, gorillas and guns: integrating conservation and development in the Central African Republic. Doctoral thesis, UCL (University College London).

A critical analysis of three approaches to tropical forest conservation based on experiences in the Sangha region:

http://www.yale.edu/sangha/PDF_FILES/ENGLISH_PDF/SEC_3/BLOM.PDF

Lent Term

What makes us Human? Introduction to Human Genetics

Dr Toomas Kivisild

Humans share many phenotypic and genetic traits with other primates and have retained largely the ancestral primate synteny in their chromosomes with only minor modifications. But we also differ from closest primate relatives in many phenotypic traits and millions of single nucleotide changes. These changes defining human uniqueness can be partitioned into two lists: a shorter list of strictly human specific and a longer list of changes that are shared by other extinct hominins. The distinction of these two lists of changes is not always clear because of incomplete fossil record and the lack of genetic data from most of the extinct hominins.

Four lectures, beginning 20 Jan

Readings:

Jobling, M.A., Hollox, E., Hurles, M.E., Kivisild, T., Tyler-Smith, C. (2013) *Human Evolutionary Genetics*: 2nd edition. Garland Science. Chapters 7-8.

The Evolution and Origin of our Species

Dr Colin Shaw

Human origins and evolution from ape ancestors to modern humans are discussed, with a focus on the evolution of human diversity.

Six lectures, beginning 3 Feb

Readings:

Boyd, R. & Silk, J. (2012) *How Humans Evolved*. 6th edition. W. W. Norton & Co.

Stringer, C. & Andrews, P. (2011) *The complete world of Human Evolution*. 2nd edition. Thames & Hudson

Human Growth and Ecology

Professor Jonathon Wells
Four lectures, beginning 24 Feb
Readings: T.B.C

The Double Burden of Malnutrition

Dr Emma Pomeroy
Two lectures, beginning 10 March
The relationship between malnutrition and poverty is explored, with specific reference to socioeconomic factors in the developing world.

Readings:

Drewnowski, A., & Specter, S. (2004). Poverty and obesity: the role of energy density and energy costs. *American Journal of Clinical Nutrition* 79(1): 6-16.
Black, R E., Victora, C.G., et al. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 382(9890): 427-451.
Varela-Silva, M.I., Dickinson, F., et al. 2012. The nutritional dual-burden in developing countries-how is it assessed and what are the health implications? *Collegium Antropologicum* 36(1): 39-45.

Easter Term

Human Adaptation

Dr Emma Pomeroy
Humans have successfully colonized almost all of the world's environments. This module considers the process of human adaptability, integrating biological and cultural factors.

Four lectures, beginning 28 April

Readings:

Moran, E. (2007) *Human Adaptability: An Introduction to Human Ecology*. 3rd edition. Westview Press.
Schutkowski, H. (2005) *Human Ecology: Biocultural Adaptations in Human Communities*. Springer, Ecological Studies 182
Wells, J.C.K. & Stock, J.T. (2007) Biology of the colonising ape. *Yearbook of Physical Anthropology* 50:191-222.

Revision Sessions

T.B.C
Two lectures, beginning 12 May

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Assessment:

This paper is assessed by a three-hour written examination. All topics are covered in a single undivided paper, and candidates must answer three questions from a choice of ten.

Supplementary Teaching:

Students are expected to have supervisions arranged by their Director of Studies. Four supervisions per term are usual, and three to four essays are typically expected.

A copy of the Part II Biological Anthropology Handbook is available from the Biological Anthropology Office on Pembroke Street, or on the Division website: www.bioanth.cam.ac.uk.