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: Prof. Martin Jones (mkj12@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 Rooms:
Michaelmas term:
Lecture Room 7 (Tuesdays), 2 (Wednesdays) Mill Lane, Cambridge, CB3 1RX
Map: http://map.cam.ac.uk/Mill+Lane+Lecture+Rooms#52.201606,0.117313,18
Lent term:
Hopkinson Lecture Theatre (Tuesdays)
Map: http://map.cam.ac.uk/Hopkinson+Lecture+Theatre#52.203036,0.119635,17
Biffen Lecture Theatre (Wednesdays)
Map: http://map.cam.ac.uk/Biffen+Lecture+Theatre#52.202579,0.121545,18
Easter term:
Lecture Room 4 Mill Lane, Cambridge, CB3 1RX
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 11th 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, 11 Oct

Primate Biology, Behaviour and Ecology
Dr Jake Dunn
In the first part of this series, we will explore the origin, evolution, diversity, anatomy and reproductive biology of non-human primates. In the second part, will discuss reproductive behaviour and rearing offspring, growing up and survival, the regulation of social relationships, and communication

Eight lectures, beginning 19 October

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

Primate 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, 18 October and recommencing on 16 November

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.

Primate 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 29 November

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

Evolutionary Genetics

Dr Charlotte Houldcroft

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 24 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.

Human Evolution
Prof. Robert Foley
These lectures explore humans in evolutionary perspective. The module will cover the evolutionary and comparative context of humans, the features that make us human and how they evolved, the history of the hominin lineage from its African origins more than five million years ago to the present day, and the evolution of human cognition, behaviour and culture.

Eight lectures, beginning 7 Feb
Readings:
Useful textbooks include:
Boyd, R. & Silk, J. (2012) How Humans Evolved. 6th edition. W. W. Norton & Co.
Lewin,R. & Foley, RA (2003) Principles of human Evolution. 2nd Edition. Blackwells.
Klein,RG. The Human Career. 3rd edition. University of Chicago Press.
Stringer, C. & Andrews, P. (2011) The complete world of Human Evolution. 2nd edition. Thames & Hudson

Nature versus Nurture
Prof. Nicholas Mascie-Taylor

These lecture will consider a range of core human traits, and how the influences of heredity and environment have been approached in research.

Three Lectures, beginning 7 March

Reading
Plomin, R., DeFries, J. C., Knopik, V. S., & Neiderhiser, J. M. (2013). *Behavioral Genetics* (6th ed.). New York: Worth Publishers.
Mackintosh N J (2011). IQ and Human Intelligence 2nd edition. Oxford University Press.
Robert Plomin, John C. DeFries, Valerie S. Knopik, and Jenae M. Neiderhiser (2016). Top 10 Replicated Findings From Behavioral Genetics. Perspectives on Psychological Science, Vol. 11(1) 3–23.
Turkheimer E. (2000). Three Laws of Behavior Genetics and What They Mean. Current Directions in Psychological Science Vol 9 no 5 160-164.
Christopher F. Chabris, James J. Lee, David Cesarini, Daniel J. Benjamin4 and David I. Laibson (2015). The Fourth Law of Behavior Genetics. Current Directions in Psychological Science Vol. 24(4) 304–312.
Silventoinen K, Sammalisto S, Perola M, Boomsma DI, Cornes BK, Davis C, Dunkel L, De Lange M, Harris JR, Hjelmborg JV, Luciano M, Martin NG, Mortensen J, Nisticò L, Pedersen NL, Skytthe A, Spector TD, Stazi MA, Willemsen G, Kaprio J. (2003). Heritability of adult body height: a comparative study of twin cohorts in eight countries. Twin Res.6(5):399-408.

Easter Term

The Double Burden of Malnutrition
Prof. Nicholas Mascie-Taylor

The relationship between malnutrition and poverty is explored, with specific reference to socioeconomic factors in the developing world.

Five Lectures, beginning 2 April

The Lancet Series on Maternal and Child Nutrition published: June 6, 2013
Shrimpton, Roger; Rokx, Claudia. 2012. *The double burden of malnutrition : a review of global evidence*. Health, Nutrition and Population (HNP) discussion paper. Washington DC ; World Bank. http://documents.worldbank.org/curated/en/2012/11/18004669/double-burden-malnutrition-review-global-evidence

Revision Sessions
T.B.C
Two sessions, beginning 17 April

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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 Archaeology and Biological Anthropology Handbook is available from the Part II Administrator, Archaeology and Anthropology Office, Downing Street.