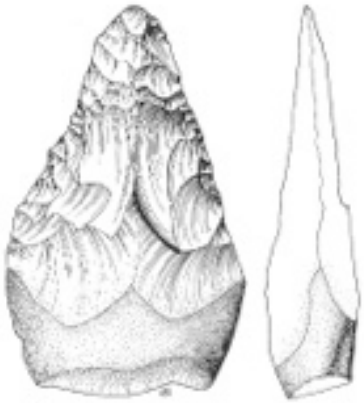
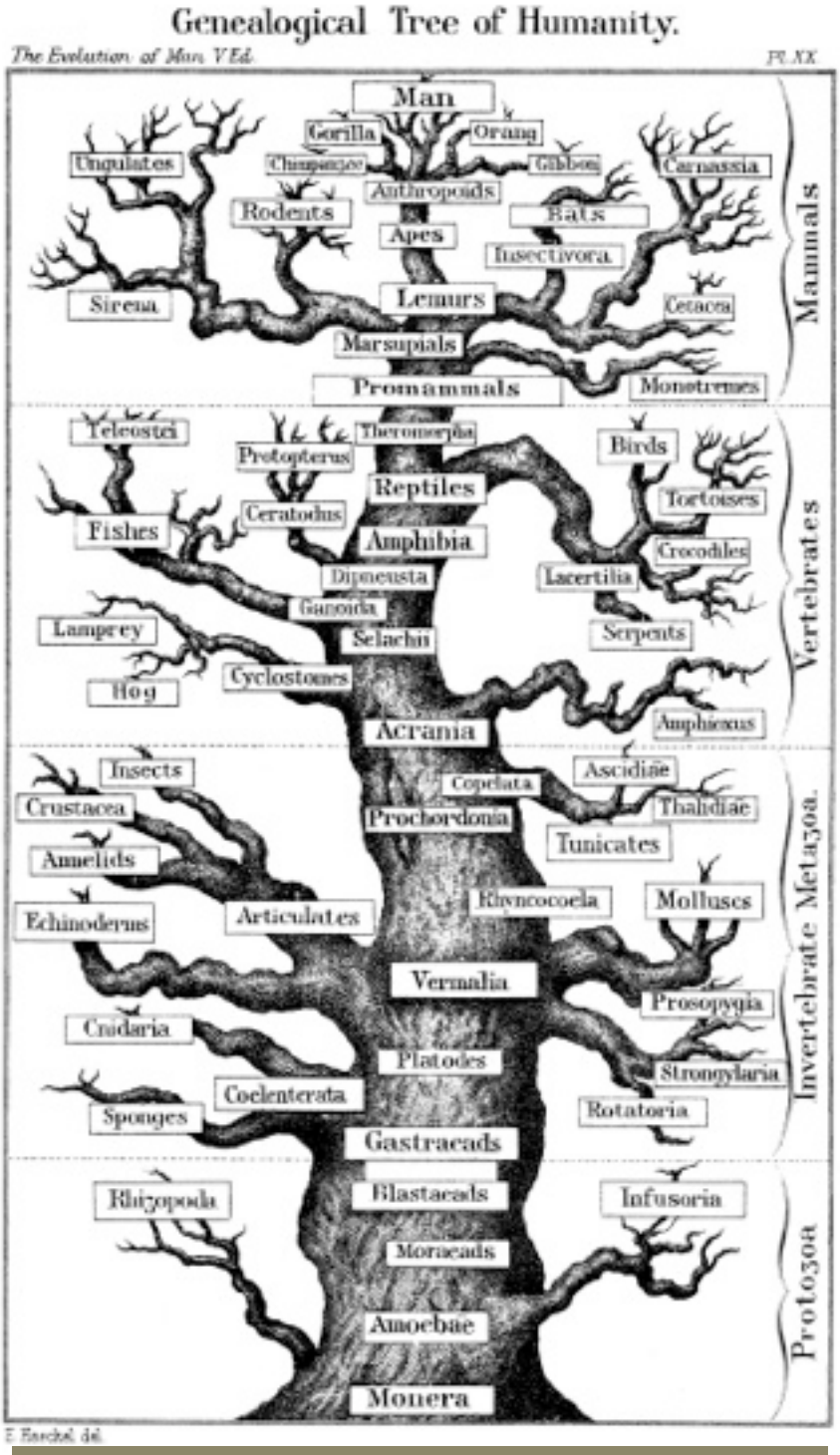
human evolution & diversity

ANTH 151
ANTH 151x

convenor: Greg Downey

tutors: Cass Grant
Fernando Hincapie
Bridget Jay
Anton Piyarathne
Stef Savannah
+external tutor
Nila Sharma





'Tree of Life,' Ernst Haeckel's *The Evolution of Man* (1874).

This unit outline for **2013**

Greg Downey:
Office W6A 611
greg.downey@mq.edu.au
@gregdowney1

Semester 2
Macquarie University
Faculty of Arts

Welcome to Anth 151/151x. This unit guide is not official, but it does contain extensive information about the unit. The official unit guide is available at: https://units.mq.edu.au/2013/unit_offerings/ANTH151/D2 or at https://units.mq.edu.au/2013/unit_offerings/ANTH151/X2 for the external offering.

Why study evolution?

New findings in such fields as archaeology, genetics and evolutionary science have radically reshaped our understanding of our species' origins and contemporary diversity. This unit examines human evolution and such topics as major changes in our brains, bodies and habitats; humans' relations to other primates; the development of technology and language; human sexuality and child rearing; and diversity in our species, including both genetic and cultural factors. We will consider a range of exciting new discoveries, from 'the Hobbit' of Flores to Neandertal DNA, from ancient domesticated plants to genetic traces of humanity's spread around the globe.

The unit is offered in anthropology because the field traditionally examines human diversity in evolutionary and comparative perspective, considering both the wide range of human experience and even our relations with other living primates as well as extinct hominids. Lecture and tutorial materials include, not only the biological evolution of our species, but also the rise and development of human society, culture, language, agriculture, and technology. Ironically, the ability to transform our worlds, to create institutions and ways of life insulated from the natural world, arose from evolutionary processes and yet this distinctly human way of living subsequently affects our evolution as a species. Shaped by evolution, human culture, skill, intelligence and social life subsequently affect our evolution.

Lectures and discussions of human evolution might appear to be anything but contemporary: what could be more out-of-date than prehistory!? But, in fact, we find that much of our current understanding of human nature, debates about human health and sexuality, proper childrearing and the depth of our differences, draws from evolutionary theory and data, makes assertions about our evolutionary past, or assumes certain things about the way we developed as a species. What kind of animal we are—and what sort of people we might aspire to be—seems to be inextricably linked to the evolutionary processes that produced modern humans.

In addition, new findings in paleoarchaeology, genetics, anthropology, psychology, primatology, and neurosciences have radically reshaped our vision of human evolution, filling in details that we could not have anticipated even twenty years ago. As new remains are found, the prehistory of modern humans is turning out to be even more interesting than we thought, confounding our expectations and teaching us to see our bodies, societies, and characteristics in a new light.

Although the Department of Anthropology at Macquarie University focuses primarily on contemporary human diversity, Anth 151: 'Human Evolution and Diversity' provides an excellent foundation for pursuing further study in medical anthropology, development studies, comparative perspectives on sexuality, and such topics as diet, language change, and the influence of technology on social life.

Summary of goals

Introduce students to certain key concepts and theories in the study of human evolution including the most important debates and new developments in the field.

Provide a clear sense of how paleoanthropologists conduct research and draw conclusions about extinct species and ways of life from material evidence.

Help students to understand, evaluate, and employ evolution-based explanations for contemporary features of human life, anatomy, and behaviour, including the limits on those explanations.

Improve students' ability to employ theoretical concepts, evidence, and analysis in general by specifically exercising these abilities on the materials covered in this unit.

Actively participate in group discussions and examinations of material related to human evolution (such as facsimile remains, site surveys, and material culture).

Analyze and express your judgement about significant debates in the study of human evolution.

Summary of lectures

Week One: Introduction

1.1 Introduction to unit requirements
1.2 Basics of evolutionary biology

Week Two: Natural selection and genetics

2.1 Darwin on natural selection
2.2 Updating Darwin: neo-Darwinism & the genetics revolution

Week Three: Humans among primates

3.1 Primates: origin and distinctive niche
3.2 The perils of comparison: chimpanzees, for example…

Week Four: Early hominids and bipedalism

4.1 Bipedalism: why walk on two feet?
4.2 The evidence of human evolution in paleoarchaeology

Week Five: Genus *Homo*: brain & dietary change

5.1 Brains, human & others (Guest lecturer: Prof. Ken Cheng)
5.2 How diet affects the brain: evolution & development

Week Six: Sex & reproduction

6.1 Human sexuality in evolutionary perspective
6.2 Human reproduction: is anything natural?

Week Seven: Midterm review & exam

Week Eight: The first technology

7.1 Lithic technology: Paleolithic innovations
7.2 Fire, clothes & other human tricks: what could Neandertals do?

Week Nine: Language origins & development

9.1 The ability to communicate: do other animals talk?
9.2 Language change

Week Ten: The epic of humanity 19 October

10.1 The rise of anatomically modern humans
10.2 Getting out of Africa

Week Eleven: Food domestication and urbanisation

11.1 The Neolithic Revolution: growing our own food
11.2 The social ape & the first cities

Week Twelve: Human variation: genes, races and cultures

12.1 Modern human variation: are we all that different?
12.2 Traces of human adaptation

Week Thirteen: Is evolution over?

13.1 Do culture & technology replace selection?: genetic evidence
13.2 Future humans

Lectures are held Tuesdays during session from 2 to 4 pm in the Lotus Theatre (W6D). Lectures are all recorded and material (such as slides, Prezi links, and links to video clips) are all available through iLearn. Slides are available in advance if students wish to print them off or bring them to lecture.

The unit is offered externally, and all students are welcome to make use of online resources, including online discussion groups and Echo 360. The unit convenor strongly recommends attending lectures in person if possible. Lectures accompany the readings, but the lectures cover material that is not available in the readings. There is simply no substitute for the material in the lecture, either through attendance, watching the video or listening to the recording.

The lecturer expects students to be respectful and keep distractions to a minimum during lecture, especially because of the videotaping. Although we are happy to take questions, the convenor reserves the right to refer longer discussions to tutorials, office hours, or outside the lecture time slot as we have limited time in which to cover the required material. Please, also, turn off mobile phones and other communication devices during all university lectures. Since you are not required to be in the lecture room, if you are distracting other students, the convenor reserves the right to ask a student to leave until he or she is longer a distraction. If your phone rings, the convenor reserves the right to answer it for you.

If there are any students with specific learning problems, they should contact Equity and Disability Support, contactable on equity@mq.edu.au or visit www.sss.mq.edu.au/equity/ for more information about their services and contacts.

Tutorial program

Tutorial One: Evolutionary dynamics and adaptation

Gould, Stephen Jay, and Elisabeth S. Vrba. 1982. 'Exaptation—a missing term in the science of form.' Paleobiology 8(1): 4-15.

Tutorial Two: Our nearest primate relatives: skulls, 'culture'?

'A Guide to the Cultures of Chimpanzees.' From Scientific American 2001, Vol. 284.

Tutorial Three: Traces in the ash: the Laetoli footprints

Laetoli footprint materials.

Tutorial Four: Food for thought: the evolution of diet

Leonard, William R. 2003. 'Food for Thought: Dietary Change Was a Driving Force in Human Evolution.' Scientific American (updated from December 2002): 62-71.

Tutorial Five: Mating strategies: the evolution dating game

Small, Meredith F. 1997. 'Our Babies, Ourselves.' Natural History Magazine (October): 42-51 (reprinted in Annual Editions: Anthropology 06/07, pp. 100-106) together with accompanying sidebars by LeVine et al.).

Tutorial Six: Stone tools

Foley, Robert, and Marta Mirazón Lahr. 2003. 'On Stony Ground: Lithic Technology, Human Evolution, and the Emergence of Culture.' Evolutionary Anthropology 12: 109-122.

Tutorial Seven: Reinventing language

Diamond, Jared M. 1991. 'Reinvention of Human Language.' Natural History 5/91: 22-28. Reprinted in Through the Looking Glass: Readings in General Anthropology. Second edition. 2000. Pp. 26-35.

Tutorial Eight: Out of Africa

Jurmain, Robert, Lynn Kilgore, and Wenda Trevathan, with Russell L. Ciochon. 2008. The Origin and Dispersal of Modern Humans. In Introduction to Physical Anthropology. Eleventh edition. Pp. 352-377. Thomson-Wadsworth.

Tutorial Nine: Out modern ecological niche

Mann, Charles. 2002. '1491.' The Atlantic Monthly (March): 1-13.

Tutorial Ten: Is race a useful concept?

George W. Gill and Jonathan Marks. 1998 and 1994. 'Issue 1: Is Race a Useful Concept for Anthropologists?' In Taking Sides: Clashing Views on Controversial Issues in Anthropology. Third edition. Kirk M. Endicott and Robert L. Welsch, eds. Pp. 2-15. Dubuque, Iowa: McGraw-Hill/Dushkin.

Tutorial Eleven: Modern selective pressures

Ward, Peter. 2009. 'What Will Become of Homo sapiens?' Scientific American 300 (1): 68-73.

Note: No meeting the first or seventh weeks!

Tutorial policies:

Tutorials begin in the second week of the semester.

Everyone must be enrolled in and attend a tutorial, either on campus or externally through iLearn (for Anth 151x).

If you need to enrol in a tutorial or have to change times, do so at Macquarie University's online student portal. You may consider taking the external unit (Anth 151x) if tutorial times do not fit into your work schedule or other commitments.

If you have simple questions about the unit, marking, assessments or the like, you should approach your tutors first, as he or she will likely be easiest to access, or look on iLearn.

Tutorial Attendance: You can miss two tutorial sessions without penalty (see Assessment policy below). Be sure to attend, and to sign the roll sheet at each session. If you cannot attend your regular tutorial, try to attend at another time. Note the day, time and room of your usual tutorial group on the roll if you are attending a tutorial other than the one for which you enrolled. If you are sick or having a crisis, your tutor will give you credit for missed attendance in most circumstances, but you must apply online for special consideration through the Faculty of Arts.

The purpose of tutorials in this course is to foster informed discussion. Therefore, you MUST read the assigned material before your tutorial; if a TA finds that you have persistently not read the material, you will have your tutorial score marked down. If you find the material difficult or there are things you don't understand in the readings, bring your questions to discuss. Make a note of the important issues that the readings and lectures pose for you and raise them at your tutorial.

Assessment

task	description	notes
Tutorials 10%	Attendance in tutorial or participation in online tutorial (for Anth 151x) is required. Students may miss up to two sessions without suffering penalty. Please make sure to sign in for attendance record.	See tutorial program for readings. Review sheets are in the unit reader. For students in Anth 151x, you must join the discussion link in each weekly module on iLearn.
Online quiz 2%	After lecture during week three, students will take an online quiz of multiple choice questions. The quiz prepares students for the format of the midterm and final.	No make-up quiz is available for students missing the quiz. A failing mark in the quiz does not automatically mean that the student fails the unit; no matter what the mark, it only counts 2% of final mark.
Exams 20% + 30%	During Week Seven and during the Exam Period, students will be required to take an exam. Exams are multiple choice. The midterm is open book and taken online; the final is closed book.	Listen to class announcements about the online midterm. Final exam dates will be scheduled by the university; we will announce when possible.
Literature review 18%	Students are required to complete a literature review, tracing scientific literature on a topic related to the unit. Instructions and a tutorial are available through iLearn.	Due 6 September through Turnitin.
Outline essay 20%	The outline essay is a 1-page introduction, outline of an essay with argument, a concluding paragraph and references (total should be four pages)	Due 18 October through Turnitin.

Assessment rationale

Unit assessment tasks are designed to assess only skills developed in this unit, and to encourage students to develop general graduate capabilities. See the online Unit Guide for complete rationale.

Unit rationale

By examining how we came to be as a species, our ancestors and nearest relatives, we come to a deeper understanding of human nature itself, including the variation that exists within our species—both biological and cultural. Evolutionary theory is one of the most powerful explanatory mechanisms for understanding all life, but it is also prone to being abused; the thorough background provided in this unit may lead students to be more sceptical around certain types of evolutionary arguments without repudiating evolutionary theory itself.

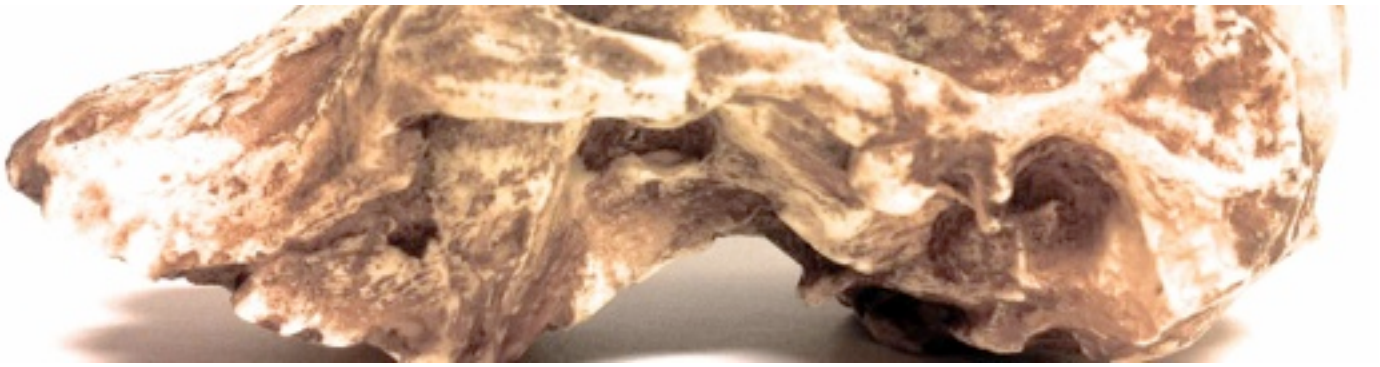
In addition, this unit on evolution and diversity provides a foundation for thinking about the relationship of culture to biology, of nature to nurture, and of psychology to social life. The questions posed by the origins of humanity are too big and difficult to solve with only half the evidence at our disposal, so we will become better practiced at understanding human holistically, one of the most important characteristics of anthropology.

Required readings:

All reading for the unit are available in a bundled course reader (with notes) available at the University bookstore.
The unit reader is a low cost way of getting all the readings. We EMPHATICALLY recommend that you buy the reader in order to have the best access possible to all the materials for the unit.

Optional readings:

A free ebook version of some of the material will be available (not yet as this outline goes to press).



Please note: all slides and other teaching materials are being reviewed. The new versions will be made available as soon as possible through iLearn.

Week One: Introduction to evolution

1.1 Introduction to unit requirements

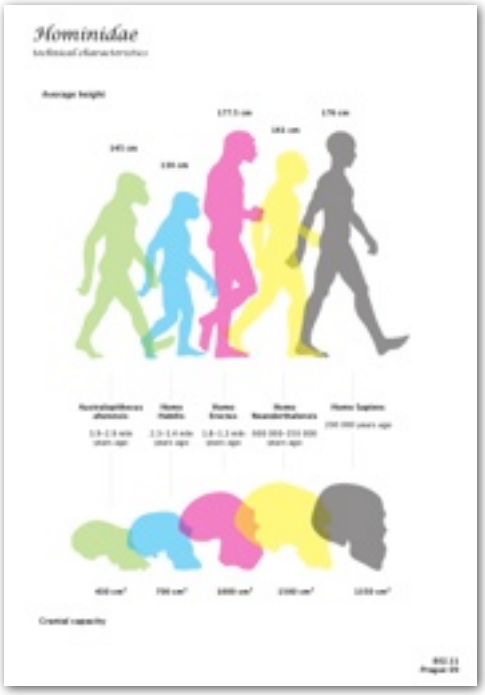
The first lecture will briefly explain why this unit has been created and what anthropology offers to the study of human origins, development, and diversity. Anthropology is the holistic social science of human diversity. In some traditions of the discipline (like the one the convenor trained within), the field includes four subdivisions: archaeological, biological, linguistic, and socio-cultural anthropology. Because of the inherent social and cultural complexity of human beings, we cannot understand human evolution without including more than just human biology; one of our primary modes of adaptation and advantages in natural selection is our ability to create, cooperate, and change ourselves to a degree that few other species can.

We will also cover unit requirements, procedures, resources, and related practical issues.

1.2 Basics of evolutionary biology

In order to understand evolutionary theory, we need to grasp some of the basics of human biology, and organismal biology more generally, especially how the anatomical traces of evolution can be seen in contemporary bodies. We will discuss how paleoanthropologists learn about life long before historical records were being left. Specifically, we will discuss three sources of information: the archaeological record, comparison with related species, and the study of modern biology, especially the traces of the past that our bodies carry around. In this lecture, we will specifically explore the biological traces of our evolution that we carry with us, including our 'inner fish' and the 'design flaws' in the human body, how it differs from a 'perfect' body, and what that might tell us about our origins.

Note: No tutorial meeting in the first week because students will not have done any reading. Reading assignments must be done in time for your tutorial during week two.



"Learning is not compulsory; neither is survival."

W. Edwards Deming

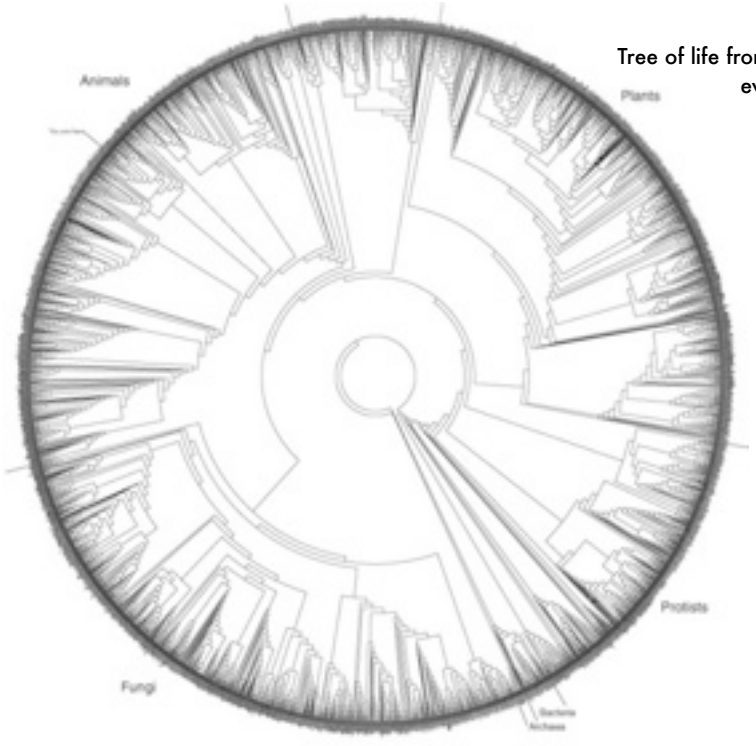
Week Two: Natural selection & genetics

2.1 Darwin on natural selection

Some would argue that the Western world is still reeling from the impact of Charles Darwin's original work, that his concepts are still revolutionary 150 years after they were first announced. Darwin's work (and others') on natural selection laid the foundation for modern evolutionary theory, even though Darwin did not initially like the term 'evolution' because he thought it implied progress. This lecture explores the basic dynamics of natural selection, including how it might produce diverse species. We will have to carefully distinguish the theory of natural selection from the popular understandings of both evolution and the 'survival of the fittest.' The lecture explores the context of Darwin's On the Origin of Species, including the perspectives he was arguing against, not just the way that his theories have come to be understand in the century and a half that followed. The greatest effect of Origin, and Darwin's theories, for our purposes, is that his framework undermined the assumption of human exceptionalism, the idea that humans were separated from other animals but an unbridgeable gulf. We will also discuss some archetypal examples of natural selection, such as Galápagos finches, artificial evolution, and examples of recent evolutionary changes in species.

2.2 Updating Darwin: neo-Darwinism and the genetics revolution

Although Darwinism is the core of modern evolutionary theory, the intervening century and a half since On the Origin of Species have required that his theory be expanded and updated, not only to include findings in genetics, but also the consideration of other forces in addition to natural selection and sexual selection that might produce species change, such as niche creation, phenotypic plasticity, genetic drift, and relatively rapid environmental change. In Darwin's time, he argued that offspring inherited traits from their parents, but he had no information about genetics to explain how this transfer took place, nor a good way to explain how variation might arise to generate new species. Contemporary evolutionary theory has expanded, and many theorists now call for an integration of evolutionary and developmental theory (some call it 'evo-devo') to draw together the study of change on both the individual and species time scale. Examples we will discuss include zebra's stripes, whether or not we have a gene for height or skin colour, if genetic disorders help us to understand how mutation might work, how selection works inside an ant hill, and why chimpanzees don't get AIDS even though they can carry a virus like HIV.

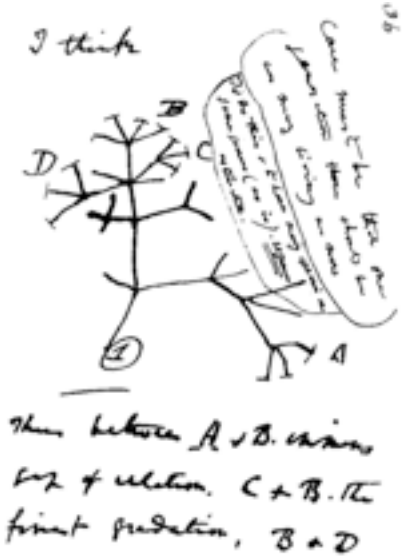


Tree of life from DNA evidence

Required readings:

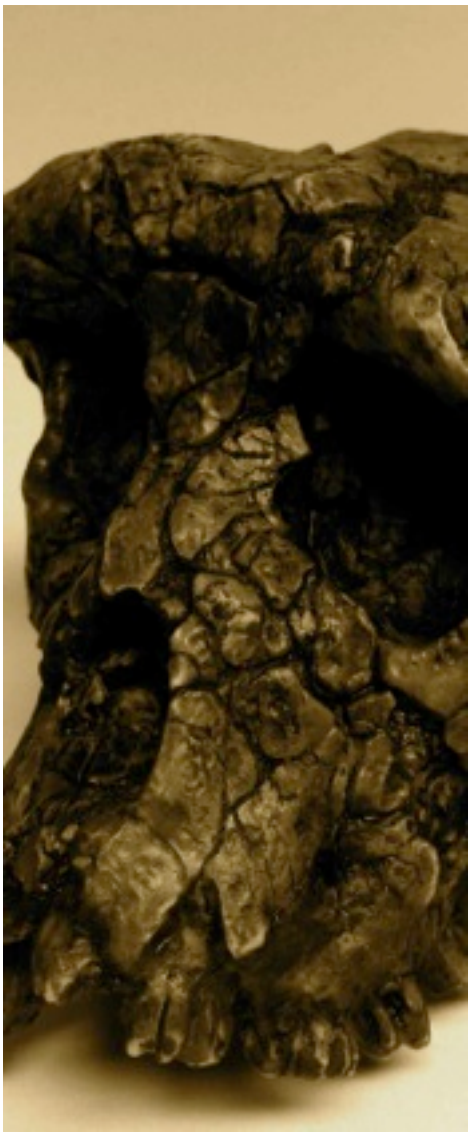
Boyd, Robert, and Joan B. Silk. 2006. 'Adaptation by Natural Selection.' In How Humans Evolved. Fourth Edition. Pp. 1-23. New York and London: W. W. Norton & Co.

Gould, Stephen Jay, and Elisabeth S. Vrba. 1982. 'Exaptation—a missing term in the science of form.' Paleobiology 8(1): 4-15.



Tutorial discussion: Evolutionary dynamics and adaptation

Organizational meeting to discuss expectations; review of key terms from readings and lecture. How might we update Darwin's theory of natural selection given what we now know about genes, non-selective processes (such as exaptation), and other factors affecting evolution? What different patterns might we expect to see depending on the types of selective forces a species might face? Please note: There are many difficult concepts this week, so please bring questions from the readings or lectures to the tutorial meeting.



Important note: Quiz available this week!

You must take your quiz online during week three before Friday at 4 pm.

Required readings:

Fuentes, Agustín. 2007. 'Primate Behavioral Ecology.' In Core Concepts in Biological Anthropology. Pp. 122-167. Boston: McGraw Hill.

'A Guide to the Cultures of Chimpanzees.' From Scientific American 2001, Vol. 284.

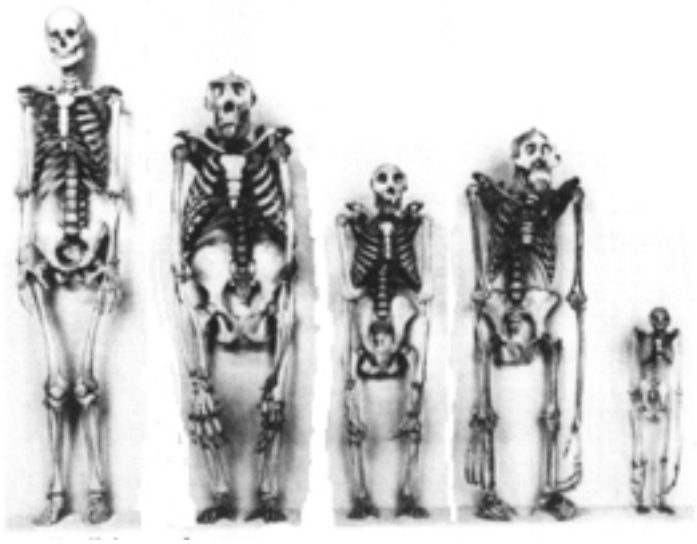
Week Three: Humans among primates

3.1 Primates: origin and distinctive niche

How did primates first arise millions of years ago and what distinctive traits did they have that allowed them to succeed in their niche? Although primates share many traits with other mammals, they also have their own distinct hallmarks, in spite of significant variation among the various types of primates. We explore the genetic evidence for relations among modern primates and what we might learn from comparisons among them as well as the fossil evidence for extinct species of primates that predate the division of the modern species we now know. Specifically, we will talk about fruit eating, the effects of our ancestors swinging from branches, and why 'you look like a monkey' is hardly an insult.

3.2 The perils of comparison: chimpanzees, for example...

Although we can learn a great deal about ourselves from comparison to other species, this method also poses some dangers. The field of evolutionary psychology offers some cautionary tales about jumping to conclusions about things like violence, sexuality, aggression, and social structure. For example, early comparisons of humans to chimpanzees were undermined both by incomplete observations of chimpanzees and by assumptions about which sorts of species we might resemble; recent, more comprehensive research has revised our understanding of chimpanzees, and comparisons to other primates like bonobos, baboons, and orang-utans, have widened our understanding of primate social life. In particular, we will examine the challenges of accounting for behaviour or psychology through evolution. We will discuss getting ahead in chimpanzee society, their social life, and patterns of cultural behaviour in primates, including monkey invention.



Tutorial discussion: Our nearest relatives: skulls, 'culture'?

What makes humans distinctive among primates? Are our differences from other species a matter of degree or of kind? During the tutorial, the group will discuss evidence of chimpanzee 'cultures' and its significance for thinking about what makes humans distinct, as well as compare casts of primate skulls. The tutorial will especially discuss the role of comparisons among species to offer evolutionary insights.

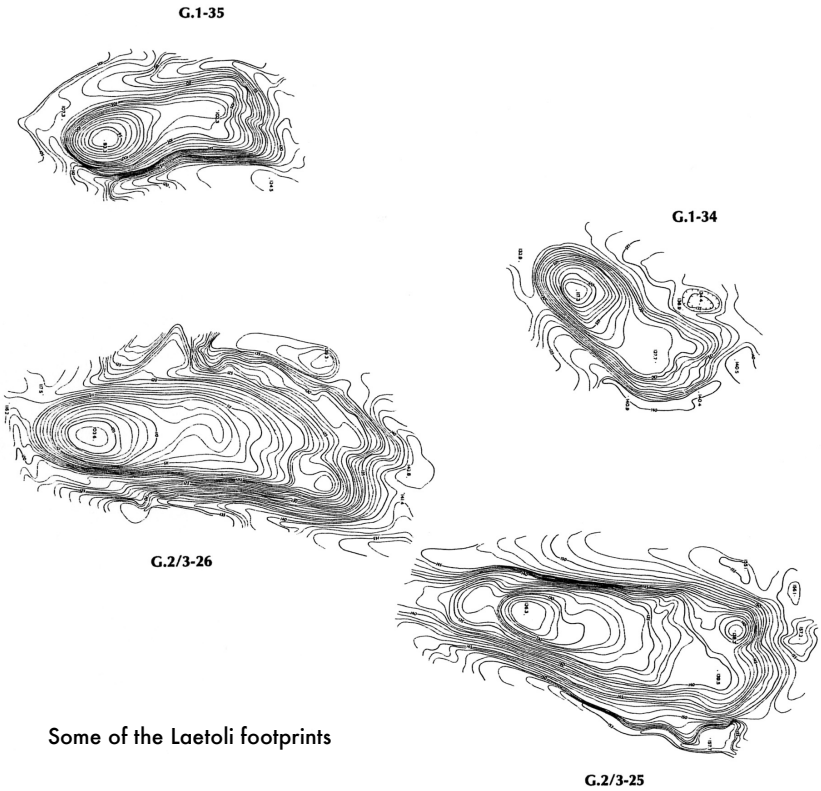
Week Four: Early hominids & bipedalism

4.1 Bipedalism: why walk on two feet?

One of the most distinctive traits of human beings is our bipedal posture and fluid two-legged gait; although we share two-legged locomotion with other species, such as kangaroos, bears, chimpanzees, gibbons, even some lizards and insects when they run, we are uniquely adapted to walking and running on two feet. In this lecture, we will explore some of the changes in our skeleton that make bipedalism possible, the explanations suggested for human bipedalism and recent evidence that pushes back the likely date at which hominins were walking on two feet, suggesting that our ancestors were still living in forest when they became more adept at walking on two feet. Recent arguments about human endurance running and hunting will also be explored, comparing humans with such adept runners as dogs and horses, and asking if some people are 'genetically predisposed' to be good endurance athletes.

4.2 The evidence of human evolution in paleoarchaeology

Bipedalism raises interesting questions about how paleoanthropologists could perceive past behaviour in the material remains left by our ancestors. The challenges of reconstructing skeletons from degraded remains will be examined especially in relation to the remains of Australopithecenes, such as 'Lucy.' In particular, we will explore the tendencies to 'lump' together diverse remains or to 'split' them into distinctive species and genus, and the immense challenges of reconstructing anatomy from fragments of ancient bones and other traces. The diversity of hominin remains suggests that the current human situation—being the lone hominid on the planet, and one of only four great ape species—is remarkable, unprecedented and relatively recent to arise. The change suggests that the current climate is hard times for hominids.



Some of the Laetoli footprints

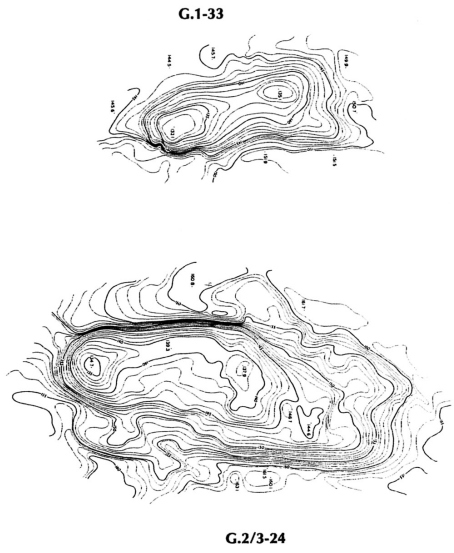
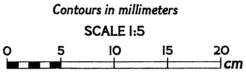


Fig. D.3 SITE G.

PHOTOGRAMMETRIC PLAN OF THE FOOTPRINTS IN THE SOUTHERN PART OF THE HOMINID TRAILS



Required readings:

Haviland, William A., Dana Walrath, Harald E. L. Prins, and Bunny McBride. 2008. 'The First Bipeds.' In Evolution and Prehistory: The Human Challenge. Eighth edition. Pp. 124-147. Thomson-Wadsworth.

Laetoli footprint materials.

Tutorial discussion: Traces in the ash: the Laetoli footprints

During this tutorial we will explore the Laetoli footprints in detail, discussing what footprints can tell us about human anatomy and locomotion. The groups will do a range of in-class activities designed to highlight how the adaptation for bipedal locomotion affected the entire hominid skeleton, including examining post-cranial remains of Australopithecenes.

Week Five: Genus *Homo*: brain & dietary change

5.1 Brains, human and others (Guest lecturer: Prof. Ken Cheng)

Guest speaker, Assoc. Prof. Ken Cheng, Department of Biology (Macquarie), a world-renowned researcher on navigation in a variety of animal species (including humans), will be talking about brains, what they're good for and how they get used. Prof. Cheng will draw on the example of simple brains, such as that in a bee, to help us understand why organisms have brains. Recent research on evolutionary brain development has suggested that selection affects different structures in distinctive fashion—not just enlarging every part of the brain equally; this 'mosaic' approach to the brain highlight what makes primate brains distinctive. In addition, he will explore some of the quirks of the human and other primate neural architecture, such as the existence of 'mirror neurons' that relate actions we see to actions we do. More abstract functions, such as language or planning, build upon these motor and perceptual abilities. This evolutionary perspective on the human brain helps us to move beyond the idea that the brain is like 'a computer' to understand how our brains help us to get around in the world.

5.2 How diet affects the brain: evolution and development

Brains and diet, skull and jaw, have long been linked in the development of primates. Big brains are hungry, demanding more energy than other bodily tissue, so growing a big brain can be expensive in nutritional terms. In addition, the cerebral dome and the jaw are linked structurally and in terms of how the skull grows in primates. The growth of the brain, then, is also a story about the shrinking of the jaw and changes in the structure of teeth. In this lecture (and in the following tutorial), we will look at the importance of skulls in the archaeological record, helping us to understand how the modern human brain emerged in a series of stages, and the implications for human life, including how our ancestors ate. We will discuss steak tartare and other raw food, some of the pitfalls of having a really big head, and the evolutionary importance of fast bowling to the brain.

Required readings:

Flinn, Mark V., David C. Geary, and Carol V. Ward. 2005. Ecological dominance, social competition, and coalitionary arms races: Why humans evolved extraordinary intelligence. Evolution and Human Behavior 26: 10-46.

Leonard, William R. 2003. 'Food for Thought: Dietary Change Was a Driving Force in Human Evolution.' Scientific American (updated from December 2002): 62-71.

Tutorial discussion: Food for thought: the evolution of diet

This tutorial will be split between examining the effects of evolutionary change on replica skulls, including the relative size of brain case and jaw, and discussing the change in hominid diet, especially the exploitation of caches of food. Students are encouraged to consider the effects of modern diet upon human development, both in individuals' lives and in the trajectory of our species. In addition, we will discuss the relative trade-offs involved in increased intelligence.

Week Six: Sex and reproduction

6.1 Human sexuality in evolutionary perspective

Like all species that reproduce sexually, humans come in male and female, and we need both sperm and egg in order to create a new human being (at least for the time being). Aside from this, however, what are the key differences between men and women? Theories of sexual selection suggest that the differing demands placed upon the two sexes by reproduction might lead to distinct reproductive strategies, even opposed interests between men and women. In this lecture, we examine the anatomical differences between men and women, including such traits as endocrine differences, penis and testicle size, enlarged breasts in women, menstruation, and other keys to understanding the evolutionary significance of sexual difference. We will use the 'Evolutionary Dating Game' and whether or not the Y chromosome might become extinct as specific ways of thinking about human sexuality.

6.2 Human reproduction: is anything natural?

Without reproduction, a species would quickly become extinct. Human reproduction, like other species', depends upon our species biology, but the extraordinary dependence of human infants makes them uniquely susceptible to environmental influences. The human reproductive environment is biologically conducive, we will argue, for generating cultural differences, traits that become so ingrained in the young human that they are, for all practical purposes, physiological in the end. In addition, social institutions such as 'the family' and 'marriage' affect human reproduction, influencing the way sexuality is expressed and the social supports for children in important ways. We will look at fertility, pregnancy, breast-feeding, mother-baby interaction, sleeping patterns, and the role of fathers (and sisters and grandmothers) in child-rearing. In addition, we will discuss the prevalence of homosexual and non-reproductive sexual activity in humans (and other animals) and whether or not this behaviour is consistent with evolutionary pressures or is 'unnatural.' The question—'Is it natural?'—permeates our lectures this day as, so often, evolutionary discussions about reproduction and sex are also debates about normative gender roles, correct parenting and sexual morality, carried out in another language.

OPTIONAL REVIEW SESSION FOR THE MIDTERM EXAM DURING WEEK SEVEN!

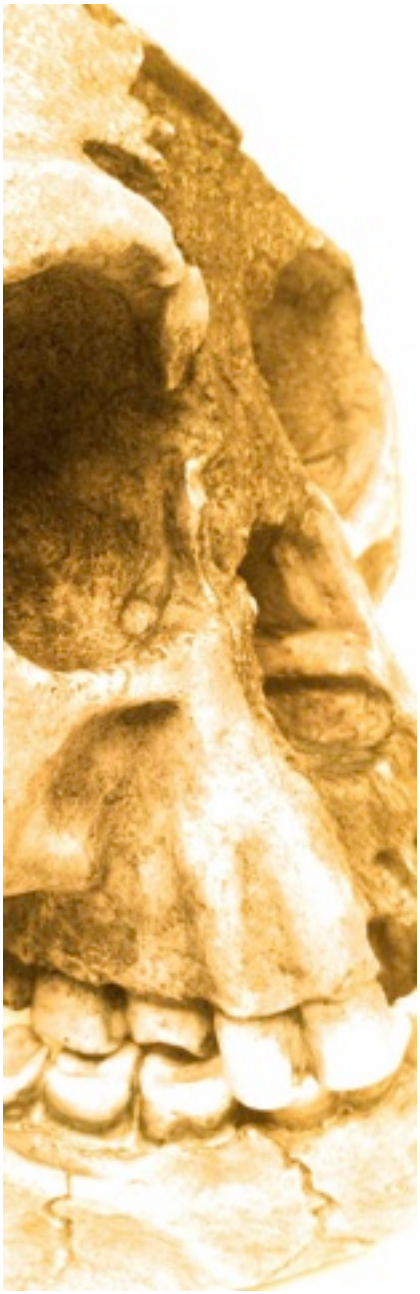
Tutorial discussion: Mating strategies: the evolution dating game

Can we determine what is 'natural' in human sexuality, reproduction, and child rearing? This tutorial examines the range of evidence about evolutionary pressures on human reproduction, especially the effect of our infants on our evolutionary sex lives. How might 'human nature' look different to people depending on the ways that gender roles, social institutions (such as marriage and family structure), and reproductive practices develop in different societies? For example, what are the most recent changes in 'human nature' in contemporary societies that might affect what we assume 'human nature' to be? This discussion will include a class reflection on how evolutionary pressures in sexual selection might affect contemporary behaviour. This tutorial will also include a review of concepts for the midterm.

Required readings:

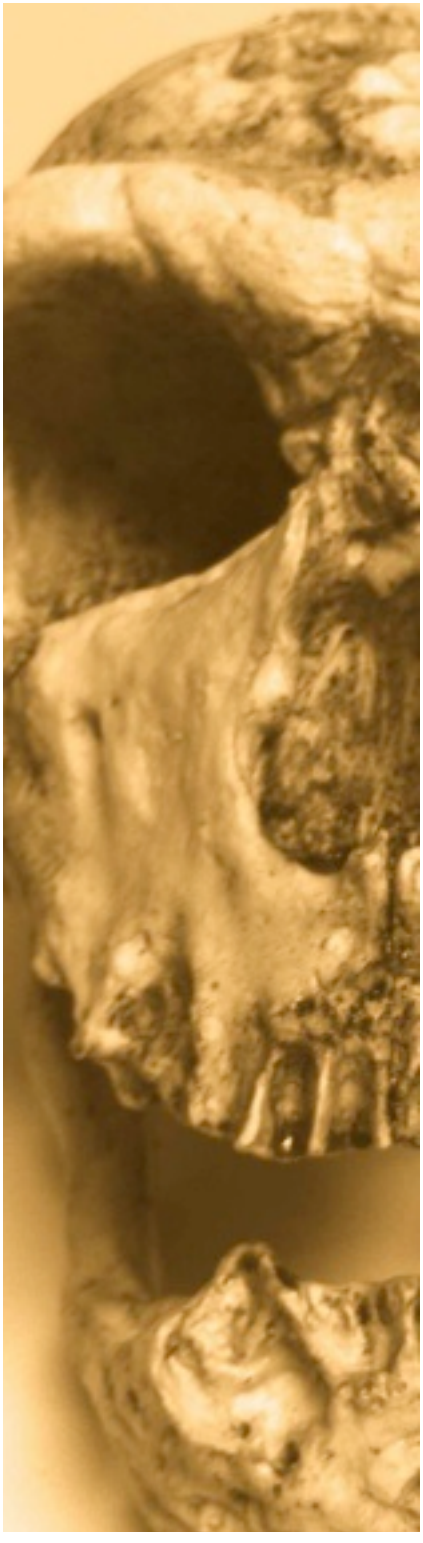
Mulder, Monique Borgerhoff, and Kristin Liv Rauch. 2009. 'Sexual Conflict in Humans: Variations and Solutions.' Evolutionary Anthropology 18: 201-214.

Small, Meredith F. 1997. 'Our Babies, Ourselves.' Natural History Magazine (October): 42-51 (reprinted in Annual Editions: Anthropology 06/07, pp. 100-106) together with accompanying sidebars by LeVine et al.).



Required reading:

Foley, Robert, and Marta Mirazón Lahr. 2003. 'On Stony Ground: Lithic Technology, Human Evolution, and the Emergence of Culture.' Evolutionary Anthropology 12: 109-122.



Week Eight: The first technology

8.1 Lithic technology: Paleolithic innovations

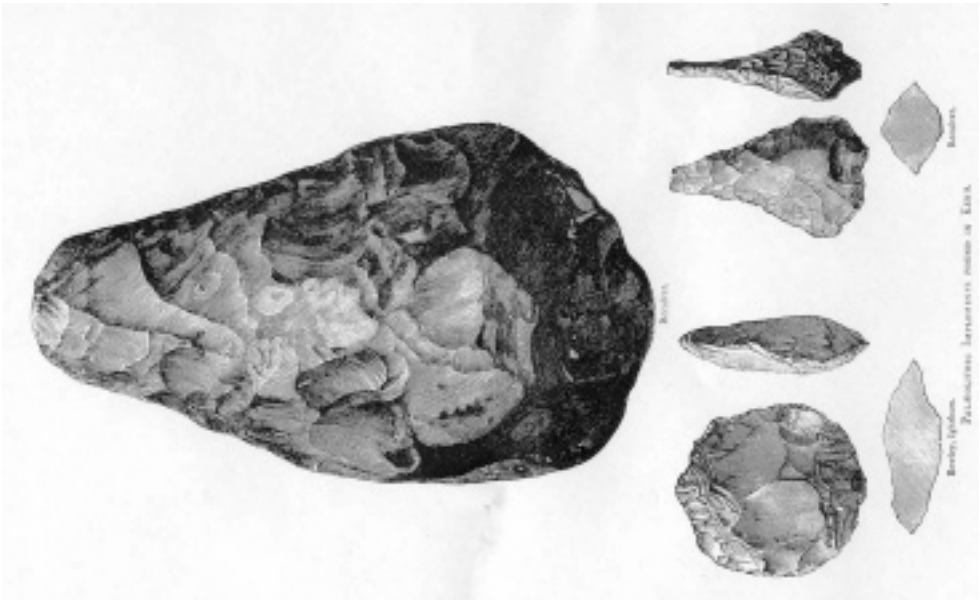
Surrounded as we are by modern technology—computers, airplanes, mobile phones—it can be easy to underestimate the importance of sharpened stones, wood, bone, and other materials in the survival of our species. Stones may not have been the only primitive tools, but they are some of the best known, best preserved evidence we have of how our ancestors lived in addition to their intellectual abilities and manual dexterity. From the remains of tools, we can learn a lot about the people who used them. This lecture explores the earliest stages in the development of stone tools, what species made them, how they were used, and what they can tell us about the people who used them, such as the food they ate, how they prepared it, how long they lived in a single place, and what sorts of skills they could develop. The lecture will touch on such topics as how to eat termites, Stone Age surgery, what makes a good stone tool, the importance of flakes, and when a small tool is better than a big one.

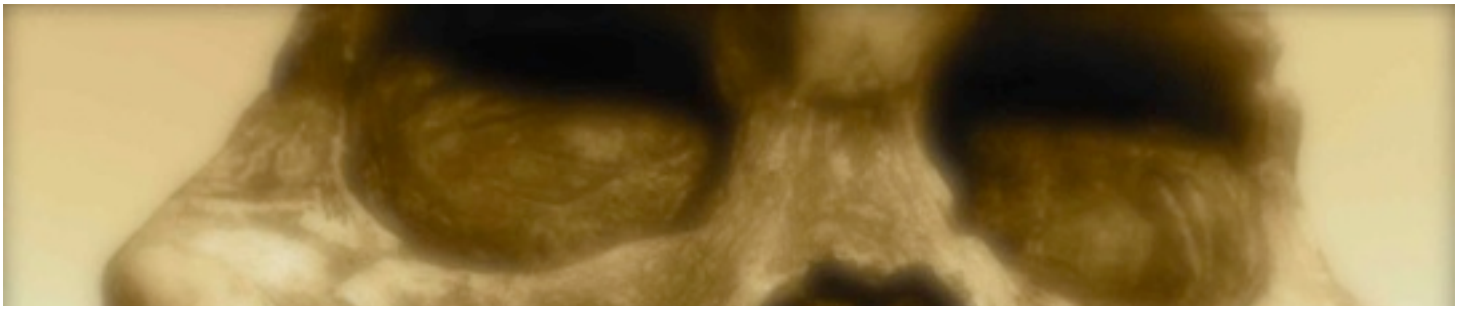
8.2 Fire, clothes and other human tricks: what could Neandertals do?

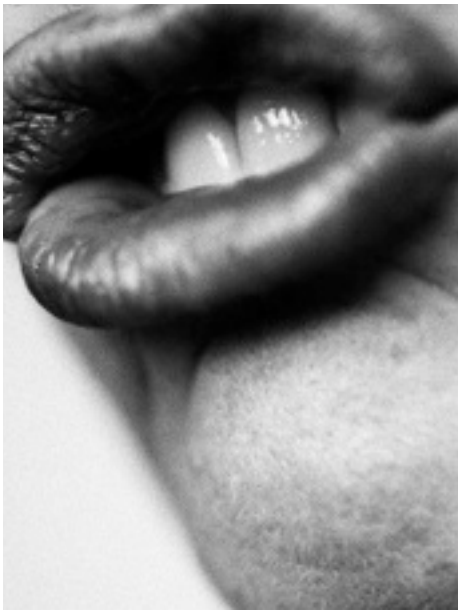
Neandertals were likely the most closely related species to modern Homo sapiens, perhaps even a subspecies (this is subject of debate). Neandertals possessed large brains, even larger than modern humans in some specimens, and they made sophisticated tools, hunted well, apparently engaged in symbolic thought, and even had rituals, judging from the way they buried their dead. So why did they become extinct when modern humans survived to the present? This lecture explores the development of Paleolithic material culture, including evidence for such things as clothing, fire, religion, ritual, ornamentation, art and other complex technology. What sort of adaptive abilities did both Neandertals and archaic Homo sapiens develop, and does this explain why the former became extinct? We will take a look at cave paintings, the importance of Venus, the first jewellery, life in an Ice Age, and the changing ways we buried the dead.

Tutorial discussion: Stone tools

How hard would it be to make each type of toolkit discussed in this class? What are the crucial changes in perception, planning, and physical technique that allowed each successive type of tool to be made? This tutorial will involve examining facsimile remains of stone tools.







Week Nine: Language origins & development

9.1 The ability to communicate: do other animals talk?

Virtually all animals communicate, but we would not typically call their forms of communication 'language.' In this lecture, we will discuss the distinctive characteristics of language, what it allows humans to do, and how linguistic capacity might have arisen in evolution. Do our brains have a special 'module' for language ability? If not, how does learning to speak and understand language affect our brain development? Recent research with teaching sign language or token languages to chimpanzees and gorillas have helped us to understand the gulf between human abilities and those of other primates, including the central role of physical traits, such as the shape of the throat, the ability to control breathing, and rapid sound sequencing and perception. This lecture will explore the question of whether chimpanzees or parrots can 'speak,' the importance of 'baby talk,' and whether the first languages might have been sign languages.

9.2 Language change

Over times, languages change, but can we say they 'evolve'? Are there more and less sophisticated languages, languages that might be better or worse at expressing abstract thought or logic? How do new languages arise, and are languages like English, Chinese and Spanish making other languages become extinct? Are there any universal traits of grammar or all languages? This lecture examines the current linguistic diversity on the planet, examining evidence of how modern languages are related, how they change, and what the future of language diversity might be, especially with so many indigenous languages apparently in danger of disappearing. Special cases to consider will include the first speakers of Creoles, recently invented languages, whether or not relativity makes sense in Hopi, what gets lost when the last speaker of a language passes away, and, like, the development of SMS, like, as a language, like.

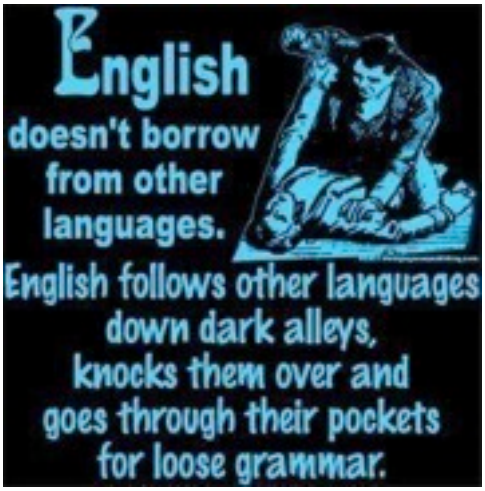
Required readings:

Fitch, W. Tecumseh. 2000. 'The evolution of speech: a comparative review.' Trends in Cognitive Science 4(7): 258-267.

Diamond, Jared M. 1991. 'Reinvention of Human Language.' Natural History 5/91: 22-28. Reprinted in Through the Looking Glass: Readings in General Anthropology. Second edition. 2000. Pp. 26-35.

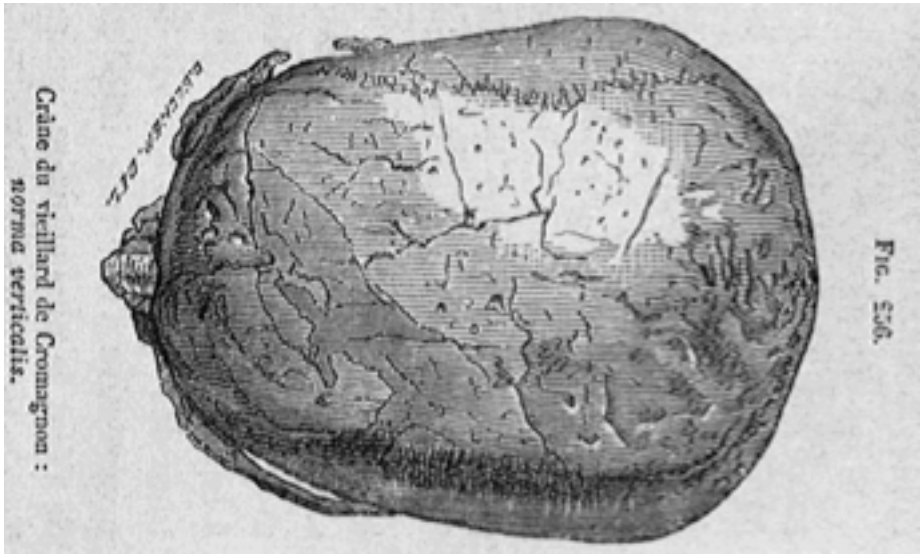
Tutorial discussion: Reinventing language

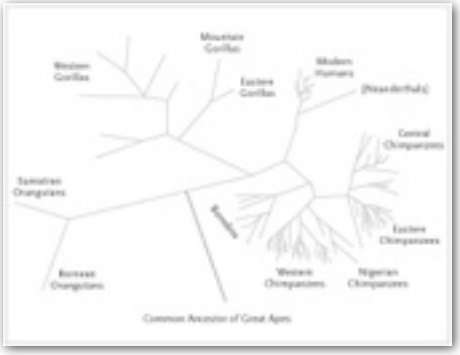
What are the rules of modern speech in your own peer groups, that is, do you and your peers have distinctive ways of talking, distinctive slang, or speech patterns that you might not share with everyone else (such as your parents)? What influences the introduction of new words and expressions into your language? Do these introductions bear any resemblance to the creation of pidgins or Creoles? What can we learn about language origins from the rise of new languages, like sign languages that deaf children create?



Tutorial discussion: Out of Africa

How has the spread of humanity affected our species and our understandings of ourselves? What were the most important adaptations and traits that allowed our species to expand further than any previous hominid and to enter into environments that repelled them? Are we 'the fittest' hominid, and how should we understand that term?





Required reading:

Jurmain, Robert, Lynn Kilgore, and Wenda Trevathan, with Russell L. Ciochon. 2008. The Origin and Dispersal of Modern Humans. In Introduction to Physical Anthropology. Eleventh edition. Pp. 352-377. Thomson-Wadsworth.

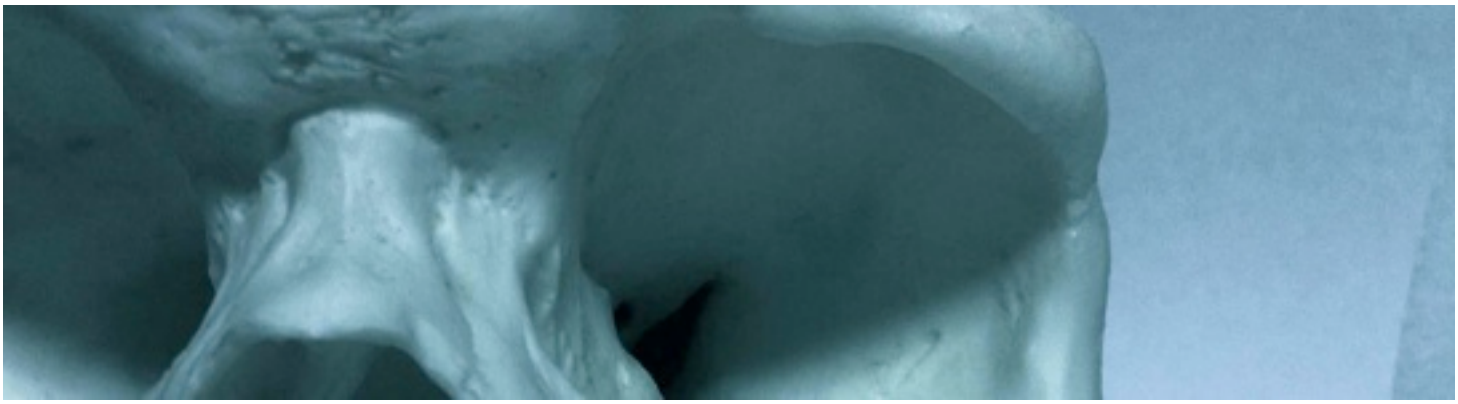
Week Ten: The epic of humanity

10.1 The rise of anatomically modern humans

No other species of hominid has been as evolutionary 'successful' as modern *Homo sapiens*, spreading further and achieving higher population levels than any previous ape (although it remains to be seen how long we will last and whether or not we will be superseded, and by what). Where and when did people like us first appear, and what allowed them to survive when every other hominid species eventually disappeared? This lecture will examine the differences between our species and its predecessors, evidence of the early social life of Homo sapiens, how humans foraged and cared for their children, and whether or not there was a 'Great Leap Forward' in human technology and development. This lecture includes a discussion of Mitochondrial Eve, would we notice a 'Cro-magnon man' on a bus, did *Homo sapiens* and Neandertals interbreed, and how our species compares with other colonizing species.

10.2 Getting out of Africa

For a young species, humans have spread far and wide, coming to cover virtually the entire globe. With the rise of anatomically modern humans in Africa, our species spread widely through Asia, Europe, Australia, to the Americas and throughout the Pacific. For a mammal, especially a large one, we have few rivals in our range, mobility, and versatility (well, maybe rats and dogs). How did we come to cover the world, what places did we settle first, and why did we ever leave Africa in the first place? We will discuss the best current accounts for the spread of humans, including how they managed to circumvent obstacles that prevented the spread of other species to different parts of the globe. We will ask a number of questions this week including, 'Okay, we left Africa—which way do we go now?', how 'The Great Race' might have looked in 70,000 BP, why Neolithic tailors were so important, and how anyone got to Hawai'i (and the Americas and Australia…) in the first place.



Week Eleven: Food domestication & urbanisation

11.1 The Neolithic Revolution: growing our own food

In the last 10,000 years, humans innovated and began to produce their own food, transforming wild animals, trees, vegetables, and grasses into domesticated sources of nutrition, labour, even decoration and companionship. Humans selectively bred domesticated species until they scarcely resembled ancestor species that appeared in nature. In Africa, Asia, the Middle East, and the Americas, groups of humans independently discovered how to control food-producing plants and animals indigenous to those areas. What are the long-term effects of domesticated food and animals on humans? The lecture will explore the almost miraculous potato, the first gardeners, the importance of dogs' sense of smell, Neolithic horsepower, whether the Amazon has been shaped by humans, and how our ancestors turned grass into grain.

11.2 The social ape and the first cities

The largest troops of apes, other than humans, include at most around 150 members. As groups grow larger than this, invariably dividing because of internal tensions or their weight on the environment. Sometime after the emergence of modern humans, our species began to create social groups far larger than anything seen before, with enormous organizational demands, division of labour, and a wholesale transformation of the lived environment to make it support increasing population density. Domesticating food sources not only shaped the food species; it transformed our species, allowing humans to multiply far beyond what naturally-occurring food sources could support. This lecture asks where cities first arose, what they would have looked like, what forms social organization first took, and the effects of urban life, including the creation of hierarchy, written language, and sedentary life. We will specifically discuss the walls under Jericho, the role of flood management in the rise of Western 'civilization,' what it was like to live outside the cities in the Andes, how many Egyptians does it take to build a pyramid, and whether or not taxes really are inevitable.

Required readings:

Olson, Steve. 2002. 'Agriculture, Civilization, and the Emergence of Ethnicity.' From Mapping Human History: Unravelling the Mystery of Adam and Eve. Pp. 90-105.

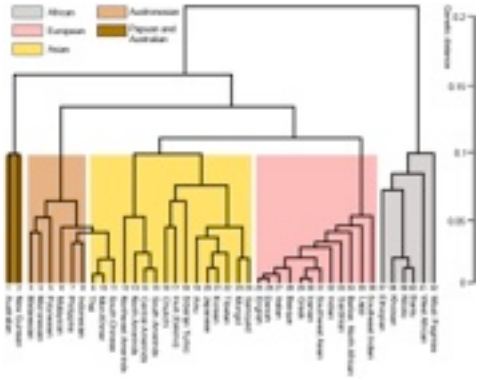
Mann, Charles. 2002. '1491.' The Atlantic Monthly (March): 1-13.

Tutorial discussion: Our modern ecological niche

Is human inequality an inevitable by-product of living in larger and larger groups? Is ethnicity or race an inevitable result of living alongside alien groups of people? Some would argue that traits like hierarchy and division are 'human nature.' Are they, in fact, the products of the ways we live socially? If so, what are the implications for issues like social discord and justice?

Photo of Stonehenge by Florian Bausch (2011), creative commons
http://www.flickr.com/photos/fbausch/6097553003/

Photo of Machu Picchu by Nathan Nelson (2006), creative commons
http://www.flickr.com/photos/mybigtrip/80830493/



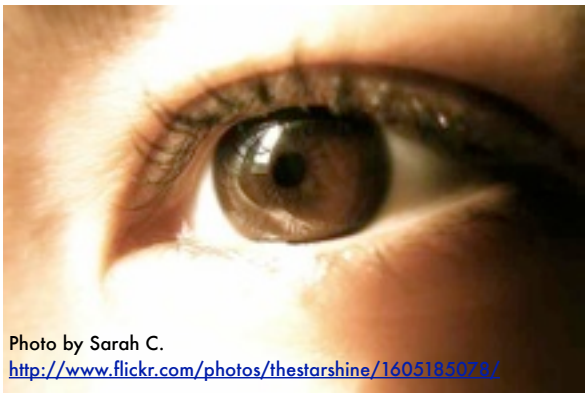


Photo by Sarah C.
http://www.flickr.com/photos/thestarshine/1605185078/

Week Twelve: Human variation: genes, races & cultures

12.1 Modern human variation: are we all that different?

Anthropologists, like many other scientists, have struggled for centuries with the obvious differences among human beings. Just how different are human beings from each other? Are all humans of a single species or are the 'races' that some societies believe in different in significant ways, ways that might suggest our species has important biological subdivisions? This lecture explores the evidence for human races and the patterns of human diversity, including new evidence from research on the human genome. The cases we will cover will include Columbus meeting his first Indians, racing and difference at the Olympics (and in footy), racial medicine, and Prof. Andrew Fraser's (Macquarie Law) case for a return to 'whites only' immigration in Australia.

12.2 Traces of human adaptation

Some theorists, arguing for a variety of different theories, have suggested that human variation, like variation in any species, creates a situation of 'survival of the fittest' among groups of humans. Although frequently labelled 'Social Darwinism,' these sorts of arguments come in a variety of different forms, some of them arguing for competititon between different geographical and genetic 'races,' in other cases within each society, among families for status and resources (and thus creating natural 'classes'). Are such processes consistent with evolutionary theory or with the data we have about human variation?

In fact, some human physiological and genetic variation follows patterns that suggest the variety is linked to adaptation; in this lecture, we will look at various forms of variation, such as skin colour, that appear to offer advantages in different ecological niches. Why are people coloured differently, and how deep do the differences go? What other forms of adaptation lie hidden in the body, such as resistance to endemic diseases, adaptation to diet or alcohol, variations in size, psychological traits, or even intelligence. We will specifically examine the examples of sickle-cell anaemia and malaria resistance, lactose tolerance, the 'tallest (and shortest) people on Earth,' why any humans turned white, IQ scores across cultures, and whether or not globalization led to the 'survival of the sickest.'

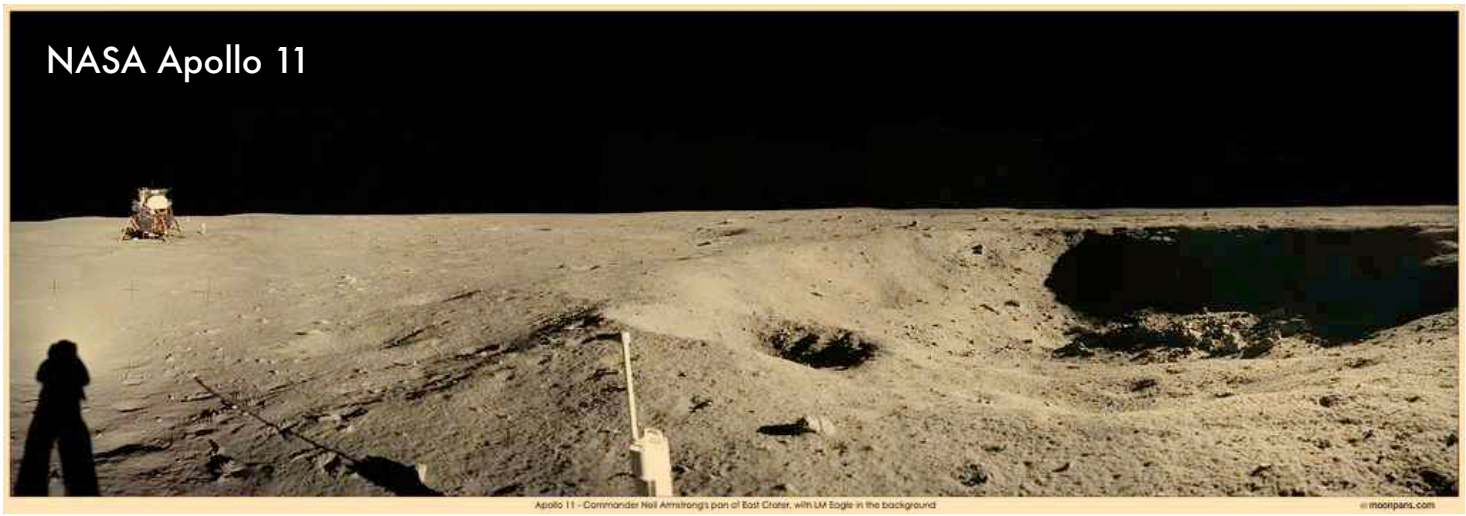
Required reading:

Kottak, Conrad Phillip. 2006. 'Human Variation and Adaptation.' In Physical Anthropology and Archaeology. Second edition. Pp. 82-96. Boston: McGraw Hill.

George W. Gill and Jonathan Marks. 1998 and 1994. 'Issue 1: Is Race a Useful Concept for Anthropologists?' In Taking Sides: Clashing Views on Controversial Issues in Anthropology. Third edition. Kirk M. Endicott and Robert L. Welsch, eds. Pp. 2-15. Dubuque, Iowa: McGraw-Hill/ Dushkin.

Tutorial discussion: Is race a useful concept?

Having heard all the evidence about the dangers and inaccuracies of thinking with 'race,' what sorts of policies might we advocate for labelling people's appearance? Under what circumstances, and in what way, does it make sense to talk about 'race'? Which evidence is most persuasive in support of the position that humans are inherently very different? Which evidence is most persuasive in convincing you that humans are more alike than different?



Week Thirteen: Is evolution over?

13.1 Do culture and technology replace selection?: genetic evidence

Many people believe that humans are finished evolving. Until recently, some anthropologists argued that the advent of language, culture and technology meant that humans had escaped the driving demands of natural selection; instead of adapting to their environment through physiological change, these theorists argued, humans adapted through culture. They even called it 'extra-somatic adaptation': that is, 'non-bodily' adaptation. This lecture explores whether we are still evolving, or whether we have stopped because our technology now does our evolving for us. We will discuss the way in which learning allows acquired skills to be passed on (a kind of Lamarckian, non-Darwinian evolution), various models of the relation of technology to evolution, and the genetic evidence of whether humans are undergoing selection. This lecture specifically explores the case of HIV and other diseases as a potential selective pressure and the genetic effects of global integration.

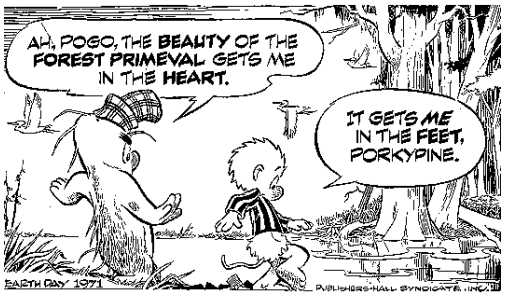
13.2 Future humans

What will humans look like? Will we develop bigger brains, lose our body hair, gain air pollution filters in our throats, lose excess muscle as we play more videogames and stop walking, doing everything from a computer console? We will review key principles from the semester by asking how they can help us to hypothesize about the future of our species. What have we learned about the rise of humans that may help us to predict their future?

REVIEW FOR YOUR FINAL DURING EXAM WEEK - GOOD LUCK!

Required readings:

Ward, Peter. 2009. 'What Will Become of Homo sapiens?' Scientific American 300 (1): 68-73.



Tutorial discussion: Current selective pressures

The tutorial sections will be split, with the first half to discuss the future of human evolution—what are the most significant pressures acting on human development right now? To ask more specifically, what forces might decrease individuals' ability to successfully survive to reproduce or pass on their genes to a future generation? The tutorial will also review key concepts for the final exam and do course evaluations.