Introduction to Anthropology: Biological Anthropology and Anthropological Archaeology

ANTH B101

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Instructors

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Course objectives

- Gain understanding of human biocultural evolution
- Gain familiarity with major fossil and archaeological finds
- Learn how anthropologists reconstruct patterns of biological evolution and cultural change
- Have hands-on experiences with a variety of human fossils and archaeological artifacts
- Become familiar with debates concerning evolution, culture change, sources of biological variation, and the concept of race from a biocultural perspective (among other things)
- Engage in critical analyses of past and present interpretations (both academic and popular) of humans and societies

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What is anthropology?

- The field of study that studies human **culture** and evolutionary aspects of human **biology**
- The study of human nature, human society, and the human past
- Etymology: from the Greek: *anthropos* (human) + *logos* (study of)

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Social Sciences
Economics
Sociology
Political Science
Geography
Psychology
Urban Studies
Social Work
Etc.

Natural/Physical Sciences
Biology
Genetics/Genomics
Geology
Physics/Geophysics
Earth Sciences
Chemistry
Etc.

Humanities
History
Philosophy
Classics
Literature
Languages
Religious Studies
Etc.

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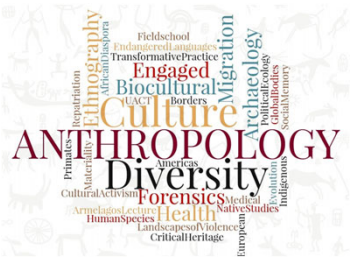
Or as the late anthropologist Eric Wolf put it:

Anthropology is "the most scientific of the humanities, the most humanistic of sciences."



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A subject with four fields

Holistic study of humankind with four subdisciplines or fields (in the US)

- **Holistic**: approach that studies many aspects of a multifaceted system

Anthropology

- Cultural anthropology
- Archaeology ✓
- Linguistic anthropology
- Biological (Physical) anthropology ✓

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History of Anthropology

late 19th century (1800s)

E. B. Tylor
1832-1917
British

Lewis Henry Morgan
1818-1881
US

Anténor Firmin
1850-1911
Haitian

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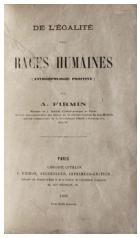
Anténor Firmin

- admitted to Anthropological Society of Paris, in 1884
- wrote *The Equality of the Human Races: Positive Anthropology*, published in 1885 (in French)
- influenced by (scientific-)positivist philosopher Auguste Comte
- argued that empirical study of humans and societies would displace speculative philosophies, e.g., racist theories of the inequality of "races"
- also, argued strongly in support of monogenism, versus polygenism



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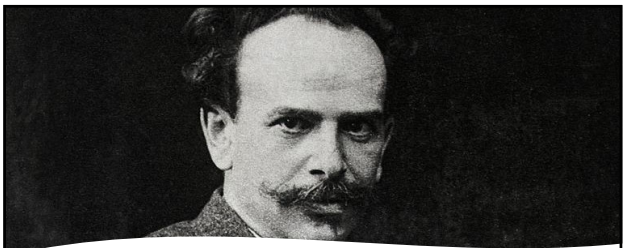

Franz Boas

- taught at Columbia University, starting in 1896 as Lecturer in Physical Anthropology, and founded first Anthropology Department in 1902
- denied claims that biological evolution supported then current theories of racial and cultural superiority
- instead, he envisioned differences as historical consequence of local adaptations and social interactions – i.e., particular histories and environments

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Franz Boas

- envisioned Anthropology as a discipline that studies all aspects of life, from language to arts, history to economy and politics, and even aspects of biology
- worked as an ethnographer and linguist, but also as a biological anthropologist and archaeologist
- "salvage" ethnography
- emphasized the concept of **cultural relativism** at the expense of ethnocentric views

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Ethnocentrism:

Cultural Relativism:

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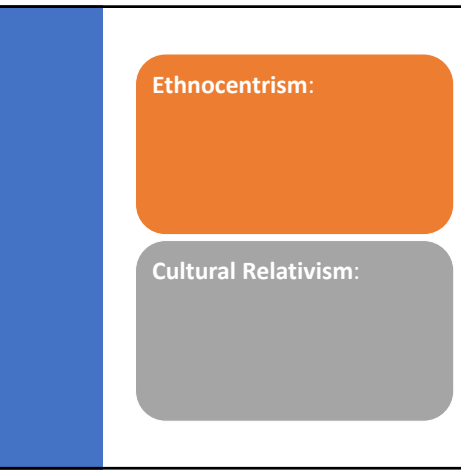

Ethnocentrism: the practice of using one's own cultural values as the standard to measure all other cultures and a belief in the inherent superiority of one's own culture

Cultural Relativism: the position that there is no universal standard to measure cultures, that all cultures are equally valid and must be understood in their own terms

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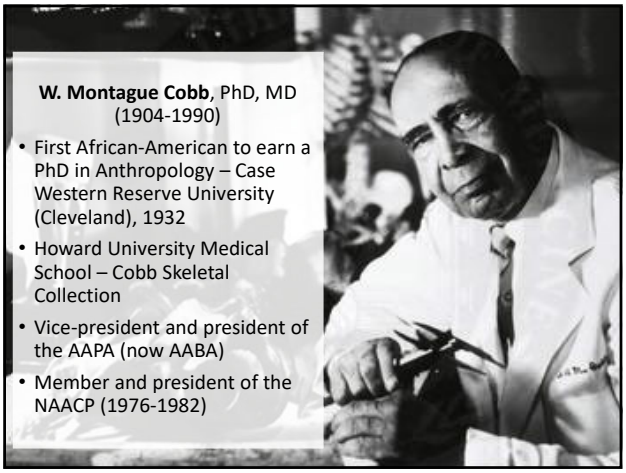

W. Montague Cobb, PhD, MD (1904-1990)

- First African-American to earn a PhD in Anthropology – Case Western Reserve University (Cleveland), 1932
- Howard University Medical School – Cobb Skeletal Collection
- Vice-president and president of the AAPA (now AABA)
- Member and president of the NAACP (1976-1982)

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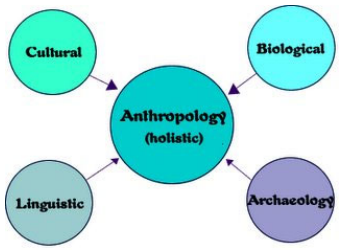
A four-field discipline



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Four subfields of anthropology

- **Cultural anthropology:** the study of living people, their social groups, and their cultural behaviors.
  - **Culture**: all aspects of human adaptation, including technology, traditions, language, religion, and social roles; culture is a set of learned behaviors, transmitted from one generation to the next through learning.
  - Also known as sociocultural, social anthropology, ethnography, or ethnology.

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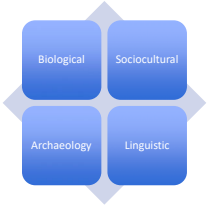
Cultural Anthropology



- Culture and society
- Environmental anthropology
- Political anthropology
- Legal anthropology
- Medical anthropology
- Psychological anthropology
- Urban anthropology
- Anthropology of religion
- Feminist anthropology
- Anthropology of gender and sexuality
- Economic anthropology
- Visual Anthropology

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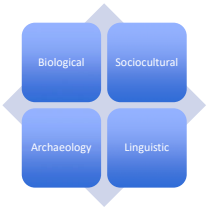
Linguistic Anthropology



- Historical linguistics
  - Language change over time (evolve); how languages are historically related
- Structural linguistics
  - How contemporary languages differ in terms of their formal structure
- Sociolinguistics
  - Relationships among social variation, social context, and linguistic variation (inc. nonverbal communication)

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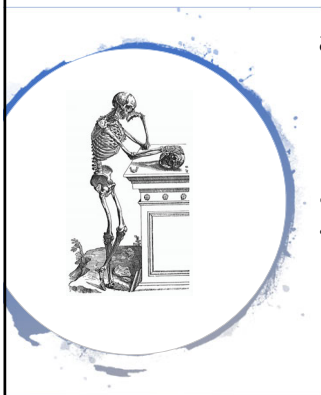
Four fields of anthropology



Biological (physical) anthropology:

- The study of human biology within the framework of evolution with an emphasis on the interactions between biology and culture.

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Biological anthropologists are… paleoanthropologists

Dr. Lauren Schroeder, University of Toronto

- Research on australopith – *Homo* transition, as well as hybridization

Dr. Sheela Athreya, Texas A&M

- Studies variation in fossils from the Middle and Late Pleistocene

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Biological anthropologists are… primatologists

Dr. Michelle Rodrigues, Marquette University

- Research into primate social behavior and endocrinology

Dr. Jane Goodall, The Jane Goodall Institute

- A pioneer in the field, studied chimpanzees in Gombe, Tanzania
- First to document apes using tools

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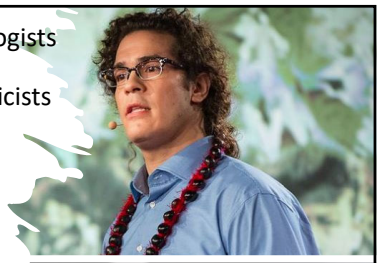
Biological anthropologists are… geneticists & genomicists

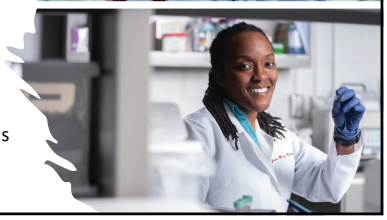
Dr. Keolu Fox, UCSD

- Research on genome editing, as well as Indigenous data sovereignty



Dr. Jada Benn-Torres, Vanderbilt University

- genetic ancestry and population history of African and Indigenous Caribbean peoples



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Four fields of anthropology

- **Archaeology:** The study of the human past using specific methods to examine the material culture left behind by past groups.

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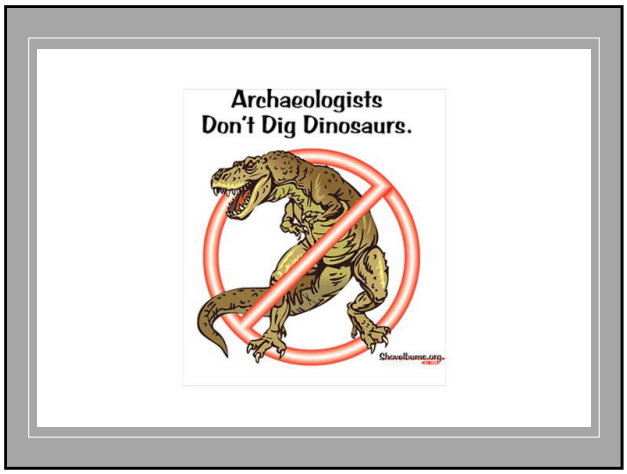

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Replica of a prehistoric cave painting from Lascaux, France

Anthropological archaeologists… study the deep past

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Anthropological archaeologists… study the very recent past

- The South Jersey Project is exploring a region in New Jersey that was almost empty of people in 1850 but by 1900 was a successful settlement of many farms centered on the town of Vineland founded in 1861 by Charles K. Landis of Philadelphia.

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Anthropological archaeologists… study the present

Jason DeLeón (UCLA), director of the Undocumented Migration Project at the Tucson-Mexico border.

This project studies the material goods left by people crossing the U.S.-Mexico border, and the impact of policies on their lives.

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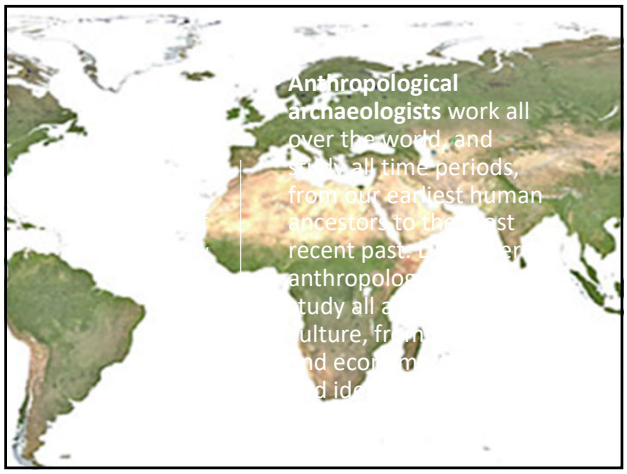

Anthropological archaeologists work all over the world, and study all time periods, from our earliest human ancestors to the recent past. Other anthropologists study all aspects of culture, from religion and economics to ideology

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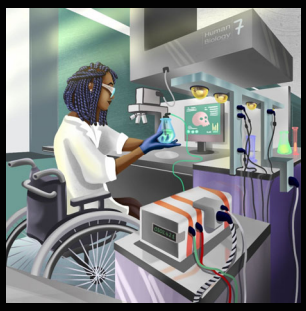
Anthropology and the scientific method



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Biological anthropology

- The scientific study of physical characteristics, variability & evolution of the human organism
- Subfields of biological anthropology:
  - Evolutionary morphology & systematics (paleoanthropology, osteology, paleopathology, forensic anthropology, human biology, adaptation & variation)
  - Behavioral ecology (humans and non-human primates)
  - Molecular (genetic) anthropology (DNA, hormones, host-parasite interactions, etc.)

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What can *bones/fossils* tell us about human evolution?

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Biological anthropologists *(an example)*

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What can *primate behavior* tell us about human evolution?

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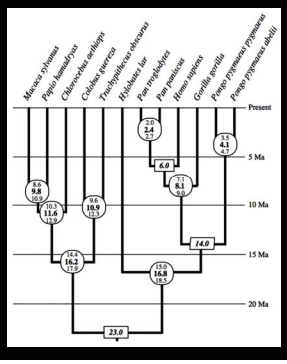
What can *DNA* tell us about human evolution?

Which living species share common ancestry

The divergence times of different primate groups

How modern humans have become adapted to their environments

Population histories



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What archaeologists and biological anthropologists do is a SCIENCE

xkcd.com

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What is science?

- Science is a process of understanding phenomena through observation, generalization & falsification.
- The general goal of science is to produce knowledge about the observable world. It is one of the ways people go about doing so.
- A process.
- A method, or set of methods.

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Science is empirical

This means that:

- Science relies on experimentation or observation of observable phenomena.
- Scientific data are evidence from which interpretations can be made & conclusions can be drawn.

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Facts

- In common usage, a fact is true knowledge.
- In science, the word isn't used very much.
  - Data are more or less *reliable*.
  - Ideas are more or less well *established*.

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The scientific method

- Observation & deduction
- Constructing a hypothesis
- Experimentation or analysis (testing)
- Interpretation of results
- Reporting results

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Step 1: Observation & deduction

- Observation is the gathering of scientific information (data) by watching a phenomenon.
- Deduction is a conclusion that follows logically from a set of observations.

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Step 2: Hypothesis

- A hypothesis attempts to explain data.
- A preliminary explanation of a phenomenon.
- An educated guess.

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What makes a good/valid hypothesis?

- Logical.
- Actually explains the data.
- Falsifiable!
- Simple.
- Consistent with other knowledge/hypotheses.

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What does *falsifiable* mean?

- There is an observation or experiment that, if made, would reject the explanation given by a hypothesis.
- Falsifiable:
  - "All swans are white."
- Not falsifiable:
  - "All swans are either white or not white."
- Unclear/subjective criterion
  - "Dogs are cooler than cats".

Science is self-correcting!

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Why should hypotheses be simple?

- For any set of observations, there is an infinite number of potential explanations.
- Whether or not the world is actually simple, *simpler explanations are easier to test.*
- Occam's Razor: one should not increase, beyond what is necessary, the number of entities required to explain anything.
- Parsimony: choose the explanation that requires the fewest leaps of logic.

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Why should hypotheses be consistent?

- So they can form a theory.
- A new hypothesis that is not consistent with what is already "known" must be well tested. Often starts a new area of research.

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What is a theory?

- In colloquial use, a theory is just a guess or a tentative suggestion ("*just a theory*")
- In SCIENCE, a theory is a collection of mutually consistent hypotheses that have withstood repeated attempts at rejection (e.g., theory of gravity)

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What is a "scientific law"?

- Law ≠ theory!
- An observation (not explanation!) valid under specific circumstances
- A hypothesis tested countless times
- For many "laws" there are known conditions under which they do not apply, or have been falsified altogether.

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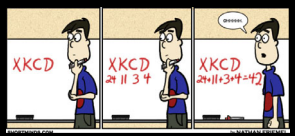
Theory of evolution

- A collection of mutually consistent hypotheses that have withstood repeated attempts at rejection
- Current best explanation for the diversity of life forms (extant and extinct)
- NOT about the meaning of life, the universe and everything



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Step 3: Experimentation or analysis (testing)

- The procedure by which hypotheses & theories are falsified or modified.
- Experimentation or analysis is done to test a hypothesis.
- Try to falsify the hypothesis. If falsified, it is rejected in its present form (can be modified and re-tested in the future). If it cannot be falsified, then it MAY be 'true' (aka robust hypothesis).

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Observable/measurable data

- Time of sunrise.
- Body weight.
- Date of a particular volcanic eruption.
- How many people are in this room.
- Presence/absence of a viral infection.
- Average birth rate in a population.

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Not data

- The color of a summer breeze.
- The world population of leprechauns.
- The length of the average unicorn's horn.
- What the tooth fairy does with your teeth.

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Quantitative vs. qualitative data

- Quantitative (measurable)
  - I am 1.69 m tall.
  - This laser pointer cost me $15.
  - Humidity today is 65%.
- Qualitative (observable)
  - I am taller than you are.
  - The color of the sky is blue.
  - Someone outside is riding a bike.

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Step 4: Interpretation

- Can the hypothesis be rejected?
- If so, or if not, what inferences can be made from this? (Inference = The act of deriving logical conclusions from factual knowledge or evidence.)
- Conclusions summarize how well data fits the original hypotheses.

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Step 5: Report Results

- Presentations at professional conferences
- Publications in peer-reviewed journals (findings are critiqued by other scientists prior to publication)

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Peer review in science

- Validation of research.
- The funding and presentation of modern science is "refereed".
  - Funding is dependent on convincing your peers (other scientists) that what you are doing is worthwhile.
  - Publication is dependent on convincing your peers that what you have found (and written up) is worth reading.

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Scientific publications

Two main categories:

- Research Article
  - The results of primary research are presented.
  - New data is related to current hypotheses.
  - New hypotheses may be introduced.
- Review Article
  - Summarizes the results from many research articles.
  - *May* take sides.
  - *May* introduce new hypotheses.

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Issues in science

- Self-correcting, but far from perfect!
- Done by people and thus can be influenced by individual and systemic biases in approach, execution and interpretation
  - Lack of diversity among researchers and research participants/samples
  - Bias towards Western traditions and schools of thought
  - sexism, racism, elitism, etc.

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Issues in science

- Initiatives aimed at increasing diversity among scientists and in scientific research
- Better policies
- Incorporating practices shown to minimize the effects and influence of bias (e.g., double-blind peer review)
- Anti-racist and anti-colonialist approaches

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