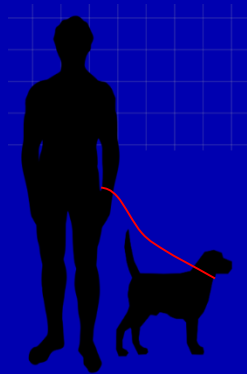


Humanities, Science, Scimat

Human



Lui Lam

Basic Fact 1: Everything Started with the Big Bang

The cosmic timeline continues with fairly well-established events leading to the present day.

Earliest Moments of the Big Bang → Formation of Atoms

10^{-35} second
Cosmic inflation creates a large, smooth patch of space filled with lumpy quark soup

10^{-30} s
One potential type of dark matter (axions) is synthesized

10^{-11} s
Matter gains the upper hand over antimatter

10^{-10} s
A second potential type of dark matter (neutralinos) is synthesized

10^{-5} s
Protons and neutrons form from quarks

0.01–300 s
Helium, lithium, and heavy hydrogen nuclei form from protons and neutrons

380,000 years
Atoms form from nuclei and electrons, releasing the cosmic microwave background radiation

Dark Ages → Modern Era

380,000–300 million yr
Gravity continues to amplify density differences in the gas that fills space

300 million yr
First stars and galaxies form

1 billion yr
Limit of current observations (highest-redshift objects)

3 billion yr
Clusters of galaxies form; star formation peaks

9 billion yr
Solar system forms

10 billion yr
Dark energy takes hold and expansion begins to accelerate

13.7 billion yr
Today

Atoms formed in stars

Earth formed

Life began

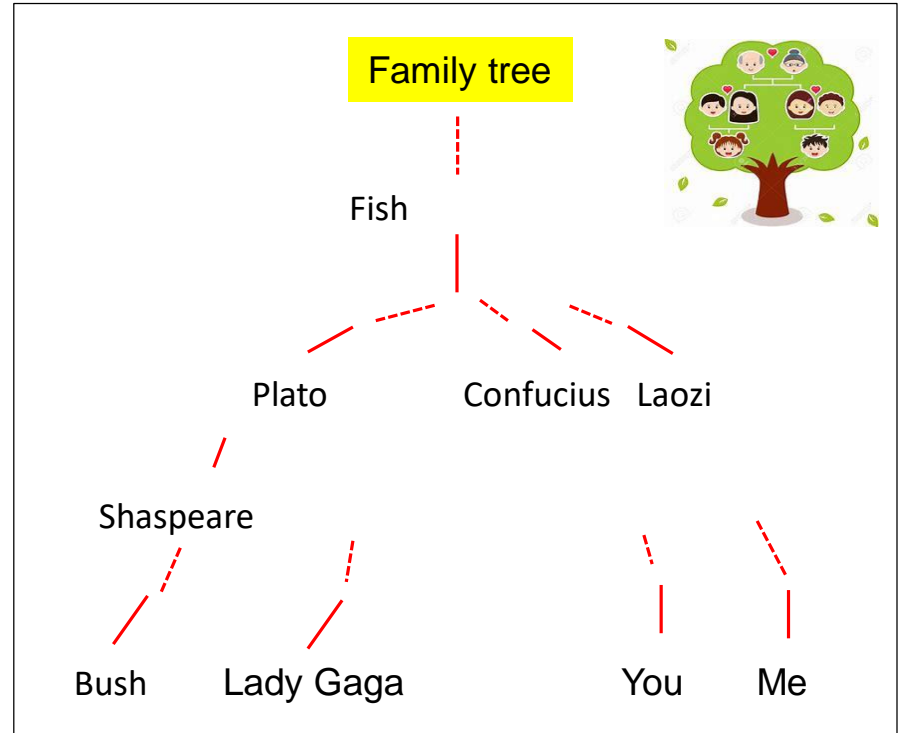
Everything on Earth is made up of atoms (coming from the stars) !

Basic Fact 2: We Are One Family, Descendants of Fish

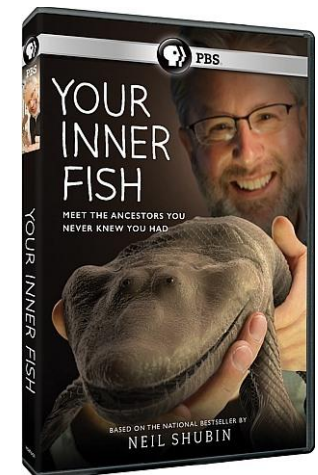
Our ancestor

Microbrachius

8 cm, 0.4 billion years ago



Darwin's evolutionary theory (1859)

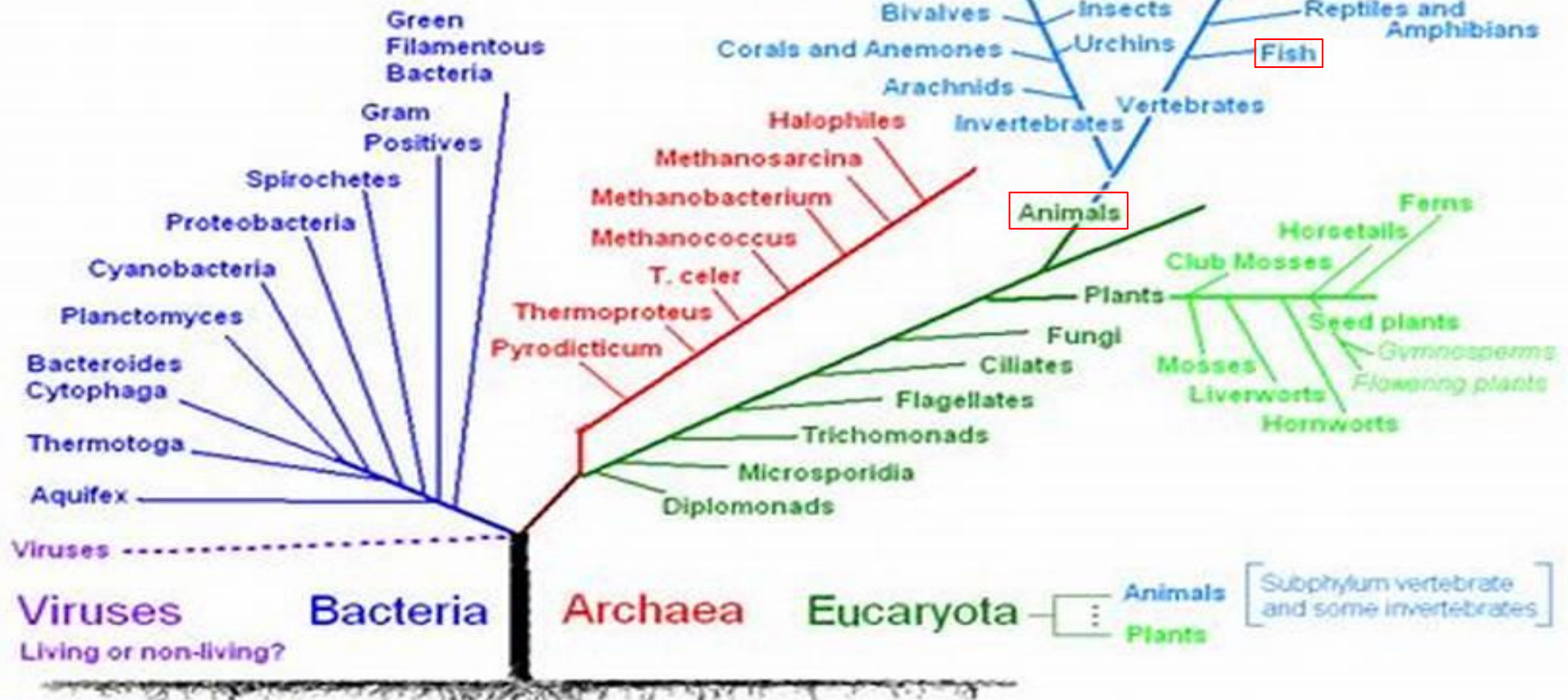




- Some 375 million years ago, the first **fish** crawled up onto land
- Fish **Tiktaalik** had enough strength in its front fins to do pushups and heave itself out of the water
- Our **arms, legs, necks and lungs** can be traced to **fish** (supported by DNA trace)
- Every one of us is **just a (jury-rigged) fish**

Tree of Life

<http://www.greennature.ca/>



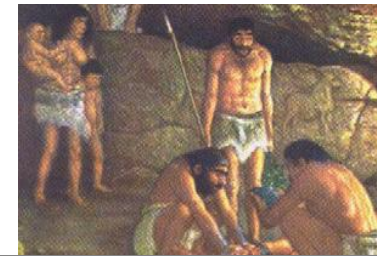
Life Emerged and Evolves

Years ago	Evolution	Migration	Life style	Art related
6 million	Chimp and human lineages split.			
2 million	<i>Homo erectus</i> appears.			
1.8 million	First wave of migration out of Africa begins.			
1.6 million			First use of fire; more complex stone tools created; arts could begin	
400,000			Earliest evidence of cooking.	
195,000	<i>Homo sapiens</i> (early modern humans) appears.			
60,000	Second wave of migration out of Africa			
35,000			Oldest known cave art (in France, Spain,...)	
10,000			Agriculture begins; first villages appear.	
5,500			Bronze Age begins.	
5,000			Earliest known writing	

Don't eat me when I am sleeping.



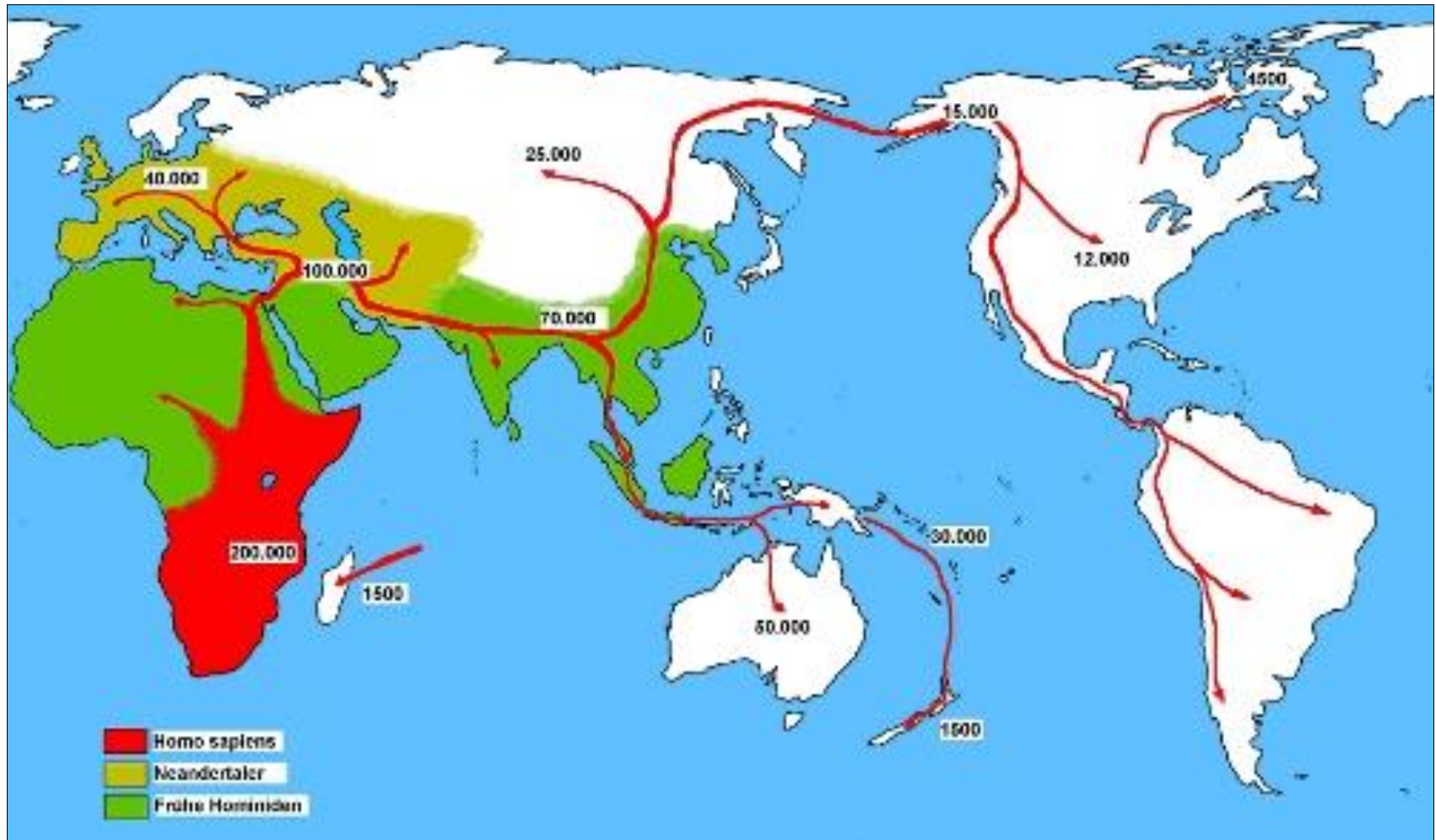
Thou shalt not covet thy neighbor's wife



Community



Out of Africa (2nd time)



- All human beings have same origin and share the same genes, with similar intelligence.
- Science developed differently in different regions (e.g., ancient Greek and China) due to different choice of research topics.

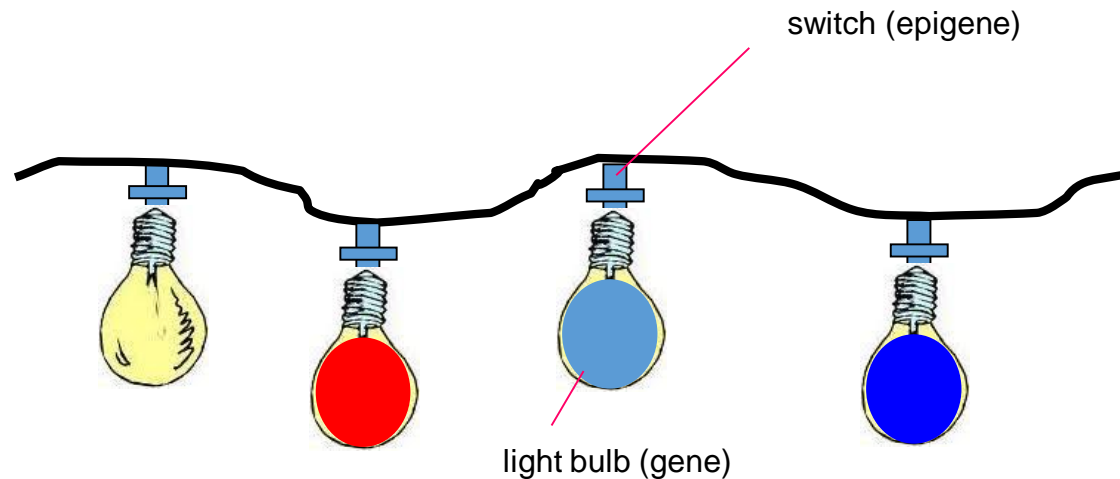
Basic Fact 3: We Are Recycled Stardust

- Everything on Earth, humans included, is made up of atoms
- All atoms came from outside of Earth. We are thus stardust
 - Hydrogen and helium formed soon after the big bang
 - Heavier atoms formed in certain stars (which then spilled into space when stars collapsed and exploded), except
 - Gold and silver were produced from black holes
- Every atom in our body is recycled from somewhere else, which could be other peoples' body, dead or alive, which you never know
- We thus could be related to each other physically. We are recycled stardust

Nature vs Nurture

- **New Understanding of Evolution (last 20 years or so):**

A combination of Darwin and Lamarck



- Learned behavior could be passed on to next generation, too, by epigenes, **which implies that**
- **Both nature and nurture are important !**

Conclusion

- Everything starts with the **Big Bang**
- Everything on Earth (including humans) are made up of **atoms** originated from outside of Earth
- We are one big family (with **fish** as our common ancestor)
- All humans originated from **Africa**
- **Nature and nurture** are both important
- **Worldviews** have to be compatible with the three basic scientific facts of human (and put in the perspective of our extremely **long history**)