So what is astrobiology?

Where do we find life in the Universe?
Life on Earth

The Microscopic

Periodic Table of the Elements

H C O N P S

The Microscopic

DNA (deoxyribonucleic acid)

The Macroscopic

Alfred Russell Wallace

Charles Darwin

Three Domains of Life

Bacteria
Archaea
Eucarya

Last Universal Common Ancestor

24-Hour Clock

0:00:00 Formation of Earth
0:00 to 3 am

12:00 Noon

4:00 Origin of Life

5:36 Oldest Fossils

6:00 to 1:52

Abundant Banded Iron-Formations

Humans 11.58-43

Dinosaurs 16.56
Coal Swamps 19.24
Land Plants 9.52
Jellyfish 8.48
Sea Anemones 6.28

Sexual Reproduction 6.08

Single-Celled Algae (Archaebacteria) 2.08

Single-Celled Protists 1.12
Terrestrial life involves ...

1. Very long times
2. Interplay of the microscopic (chemistry) and the macroscopic
3. Non-conventional conditions

Where elsewhere can we look for these things?

The Solar System
Use the Solar System to investigate …

1. Long time spans
2. Macroscopic and Microscopic
3. Non-conventional conditions

How to Study?
Telescopes, Observatories

Lick Observatory
NRAO

Orbiting Spacecraft

Europa, a moon of Jupiter

Landers
Study samples from a distance

Mars

Orbiter & Lander

Saturn and Titan
Cassini-Huygens Mission

Probe Landed: January, 2005
Sample Collection

Impact
Comets
Deep Impact Mission
July 4, 2005

The Milky Way Galaxy

Filter out the red color and rotate.
Almost 2700 Extrasolar Systems Known

Almost 3600 Extrasolar Planets Known

Late January 2018

About 3,000 galaxies here ... 
extrapolates to over a 100 billion!
Astrobiology is the study of
the nature, the conditions, the origin, and the extent of life in the Universe.

... to be continued.

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http://www.astro.umd.edu/~rhudson/ASTR380/