

Are we Unique?

An exploration of how very unusual planet earth is, and why this may mean that complex life is very rare in the universe.

Instructor : Rich Seifert, Professor Emeritus . University of Alaska Fairbanks

Course outline draft: OLLI Spring 2014 April 9-30 Wednesdays 12:30 PM - 3:00PM

This course is for the interested thinker and the intellectually curious, and explores the vastly wide-ranging conditions of planet earth over its entire history, including the geochemistry, formation of the solar system, evolution and climate, the unexpected importance of placement in the solar system, plate tectonics, the earth's magnetic field, our uniquely large and important moon, even placement of the our solar system in the Milky Way Galaxy.

ALL of these conditions, the physical, cosmic, galactic chemical, lunar, tidal, geomagnetic, climatic, and biological factors contribute to making earth an especially good place to live and be. The crucial insight here is that this may be extraordinarily unusual in the universe. Consequently, in the course I will attempt to show how these various factors interplay and contribute to a habitable, stable environment for us, indeed, made us possible.

The following books are major sources of content for the course and are highly recommended reading:

“Wonderful Life,” by Stephen Jay Gould, (1989) The Burgess Shale and the Nature of History. W. W. Norton and company.

This is one of the foremost books describing the Cambrian explosion which will be further discussed in the course, and why it is important. Also develops the concept of contingency and the probabilistic reality of evolutionary history. Will include actual photos from a visit the instructor made to the Burgess Shale in British Columbia (Yoho National Park) in 2009, where the most important Cambrian fossils on earth were found. This will be the primary topic for the first day of the course.

“Rare Earth”, Why Complex Life is Uncommon in the Universe, by Peter D. Ward and Donald Brownlee. (2000) Copernicus Books

These two gentlemen are both professors at the University of Washington. one a geological paleontologist, the other an astronomer. They explore in great and credible scientific detail a radical hypothesis: While primitive organisms such as microbes are very likely abundant across the galaxies, advanced life, depending as it does on a myriad of special circumstances, is altogether another story. They provide

an exciting and thought-provoking departure from the widely held view that there must be countless other civilizations of intelligent beings out there. Ward and Brownlee suggest that life-forms with which we could likely communicate must be exceedingly rare.

**“A Short History of Nearly Everything”, by Bill Bryson (2003).
Broadway Books, Random House**

This book is mainly supplemental to the course, but includes some marvelous passages of great insight.

Day 1, April 9: Cover the book *Wonderful Life*, and the Cambrian explosion, and show the types of enormous variability of body plans and creatures which comprised this unique evolutionary period, the Cambrian. Includes visual presentation of the Burgess Shale exploration from the Centennial visit in 2009, of the discovery quarry of Charles D. Wolcott in 1909. Concepts of contingency, extinction importance, speciation rates, evolution.

Day 2 April 16: Topics from “Rare Earth”

Why Life might be Widespread in the Universe

Habitable Zones in the Universe

Building a habitable Earth

Life’s First Appearance on Earth

How to build Animals

Day 3 April 23:

Snowball Earth

The Enigma of the Cambrian Explosion

Mass extinctions and the Rare Earth Hypothesis

The surprising Importance of Plate Tectonics

Day 4 April 30:

The Moon, Jupiter, and Life on Earth

Video presentation of the moon’s hypothetical formation

Testing the Rare Earth Hypothesis

Ultimately, What could this mean, philosophically and biologically?

Open Discussion to continue on our path....