

ARE WE ALONE IN THE UNIVERSE?

"Homo sapiens has been walking the planet for three hundred thousand years, it is therefore of great importance that in the next fifty years we could learn that we are not the only intelligent species in the cosmos. We don't know who or what we'll find, but simply learning that we are not alone will be a revelation, and a fact of life for every one of our descendants." said by Seth Shostack, SETI Institute Fellow and senior Astronomer.

The probability of whether other planets may be home to intelligent beings like us is still low, but this has not limited some scientists like Seth Shostack and Silvano Colombano to dive in the realm of extra-terrestrial intelligence found in our universe. Questions like: Are we alone in the universe? Are there advanced civilizations that we can detect and interact if we do? And how can we better the methods of making contact? Were fundamental in the establishment of an institute with the purpose of finding extraterrestrial life, called SETI (Search for Extra-terrestrial Intelligence).

The word extraterrestrial simply refers to anything beyond this world we live in. Although our ancestors were the first to make some speculations about what's beyond their sky, the question of whether other inhabited planets exist in the universe was a consequence of the Copernican Revolution of ideas. Astronomers or astrologers or star crafts as they were called before Copernicus lived believed in the ideas of Plato and other philosophers of their time who crafted the Earth-centered theory whereby all other heavenly bodies orbit the Earth. Later Nicolas Copernicus and Galileo Galilee

postponed the Sun-centered theory showing that the Earth and other planets revolve around the sun; likewise all other planets revolving around their own stars. This showed that other planets were conversely other worlds capable of supporting life.

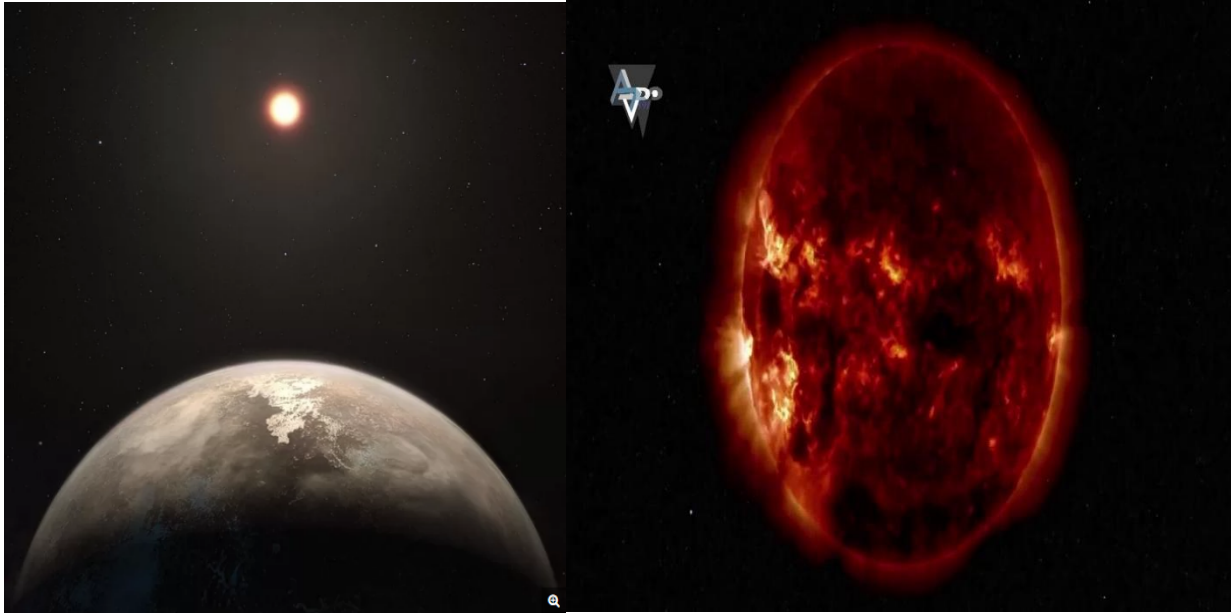
Astronomers in our century unlike those of the Renaissance (Johannes Kepler and others) have started exploring not only planets in our solar system but also planets far beyond our galaxy or exo planets as they are so called. If we talk about extraterrestrial livings we do truly refer to what we could find that lives in our universe capable of exhibiting life characteristics as we know them. Research has shown so far that planets in our solar system have a little chance of supporting life as we know it, although we cannot ignore some promising expectations that we may find as research advances on Mars, as it is thought of supporting life. This is why based on some prominent scientists including Stephen Hawking who have proposed that the sheer scale of the Universe makes it improbable for intelligent life to exist only on our planet we may rarely say that "With so many stars, alien life is probable!"

Shostak notes that there is no direct proof for any life beyond Earth, but the universe is home to a lot of stars. And as research over the past decade has shown, perhaps at least 50 percent of those stars harbor planets. Shostak estimates there are [1 trillion planets in the Milky Way](#) alone. "Surely some of them have undergone what Earth has undergone and developed life. The argument, he notes, is simply one of probability. "If we are the only intelligent beings in the galaxy, or for that matter in the universe, then we are truly a miracle," he says.

Water is a key ingredient for life as we know it. And liquid water, it turns out, is fairly common in our local solar system. For example, evidence is mounting that liquid water may flow underneath the surface of Mars. Europa, a moon of Jupiter, appears to have a liquid ocean. So too might the Jovian moons Callisto and Ganymede. Saturn's moons Titan and Enceladus, may be watery. Even Venus might have a bit of liquid water in its atmosphere. "There you already have seven other worlds that might have liquid water, just in our backyard. So that's kind of encouraging news that we may not be alone in the universe," Shostak says.

Maybe another proof that there might be evidence of extraterrestrial life in our galaxy or universe is the newest reporting of twin planets to Earth! Astronomers are studying a new range of exo planets that may have similar characteristics with Earth thus deriving the name [Earth's twin planets](#). There are many planets which have so far been reported but none have raised astronomers and scientist's attention as **Ross 128b** and **Kepler-186f**.

Ross 128b may be a decent abode for life. Lying 11 light years from our planet it is likely a rocky and temperate world that could potentially have liquid water on its surface. The planet appears to circle in the "habitable zone" of its host star **Ross 128** which is a dim [red dwarf](#) star. It completes one orbit every 9.9 Earth days.



From left **Ross 128b** together with its star on right side **Ross 128**

The temperatures at or near the surface of the star are around 3000 degrees Celsius, the researchers used this information along with Ross 128b's radius and orbital distance to figure out how much stellar energy the planet receives and therefore how hot it is. The result Ross 128b probably has an equilibrium temperature of about 21 degrees Celsius making this planet a complete mystery of whether it would support life!

Kepler-186f is an exoplanet orbiting the **red dwarf Kepler-186** about 582 light-years from the Earth. It is the first planet with a radius similar to Earth's to be discovered in the habitable zone of another star. It has an Orbital period of 129.9 days. Comparing our **Sun** and **the red dwarf Kepler-186**, Kepler 168 has a temperature of 3755 K and is about 4 billion years old, about 600 million years younger than the Sun, which is 4.6 billion years old and has a temperature of 5778 K.

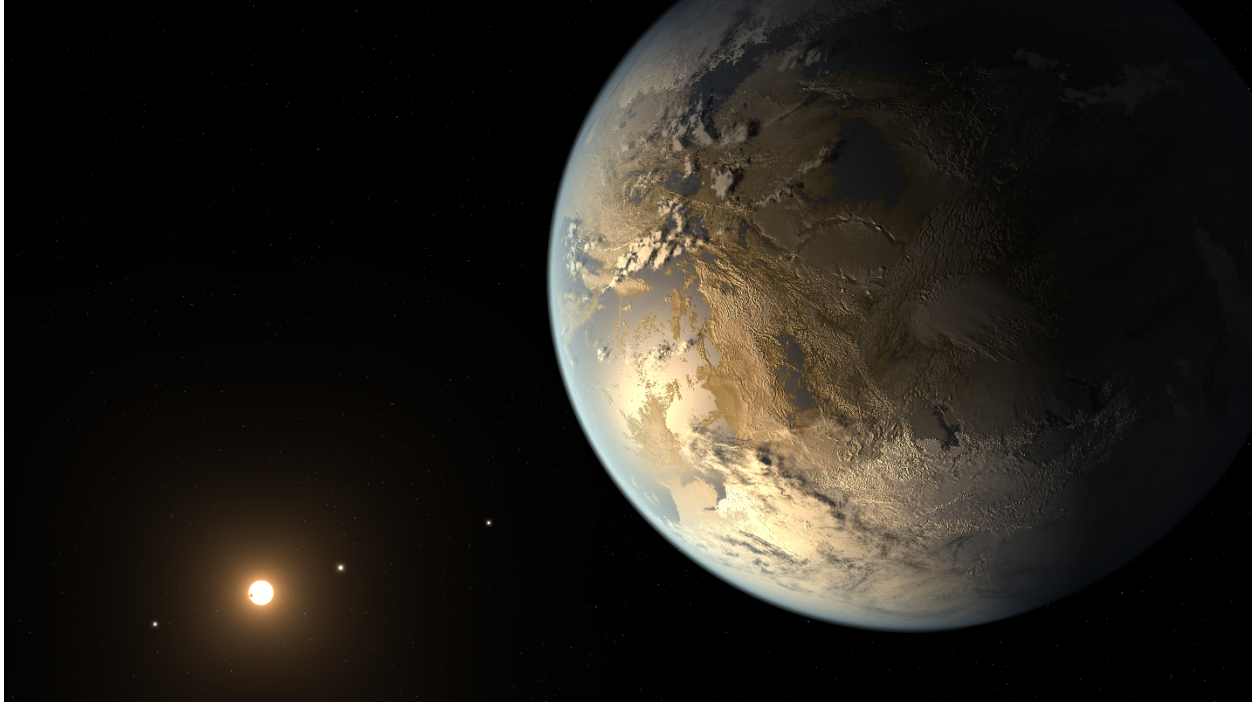


Figure above depicts an artist's impression of planet Kepler 168f.

Kepler-186f resides in the Kepler-186 system about 500 light-years from Earth in the constellation Cygnus. The system is also home to four inner planets.

Regarding these planets and their promising rare chances of supporting life the idea of whether there might be planets capable of supporting life has gained effort as so it is to the existence of extraterrestrial intelligent beings!

The Kardashev scale is a speculative method of measuring a civilization's level of technological advancement, based on the amount of energy a civilization is able to utilize.



This may sound so crazy but imagine all the technological advancement that has been reached throughout history of humankind; electricity, combustion engines, computers and even the worst of them, nuclear weapons. Scientists do truly believe that the way we interact with science and technology depends on which amount of energy that we receive i.e. the sun is the main source of energy we use in our daily life. This implicates that if somewhere on another planet in the universe inhabits intelligent beings, we may hope to predict their level of technology depending on the amount of energy supplied by their stars.



Even though we could discover other life-supporting planets in the universe, the technology we have currently may not permit us to intervene there. Imagine, the energy required to accelerate an Enterprise-size starship to near the speed of light is greater than the energy that can be extracted from all the remaining fossil fuel on Earth, so fast travel between the stars is incredibly difficult (or impossible). The more appealing thought for many people is that currently we are being visited by extraterrestrial intelligent beings from other planets which became popular by the name **Aliens**. Of course, a scientist would consider such a suggestion of interest only if it could be proven by observations. Bright ideas are nice, but evidence rules!



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