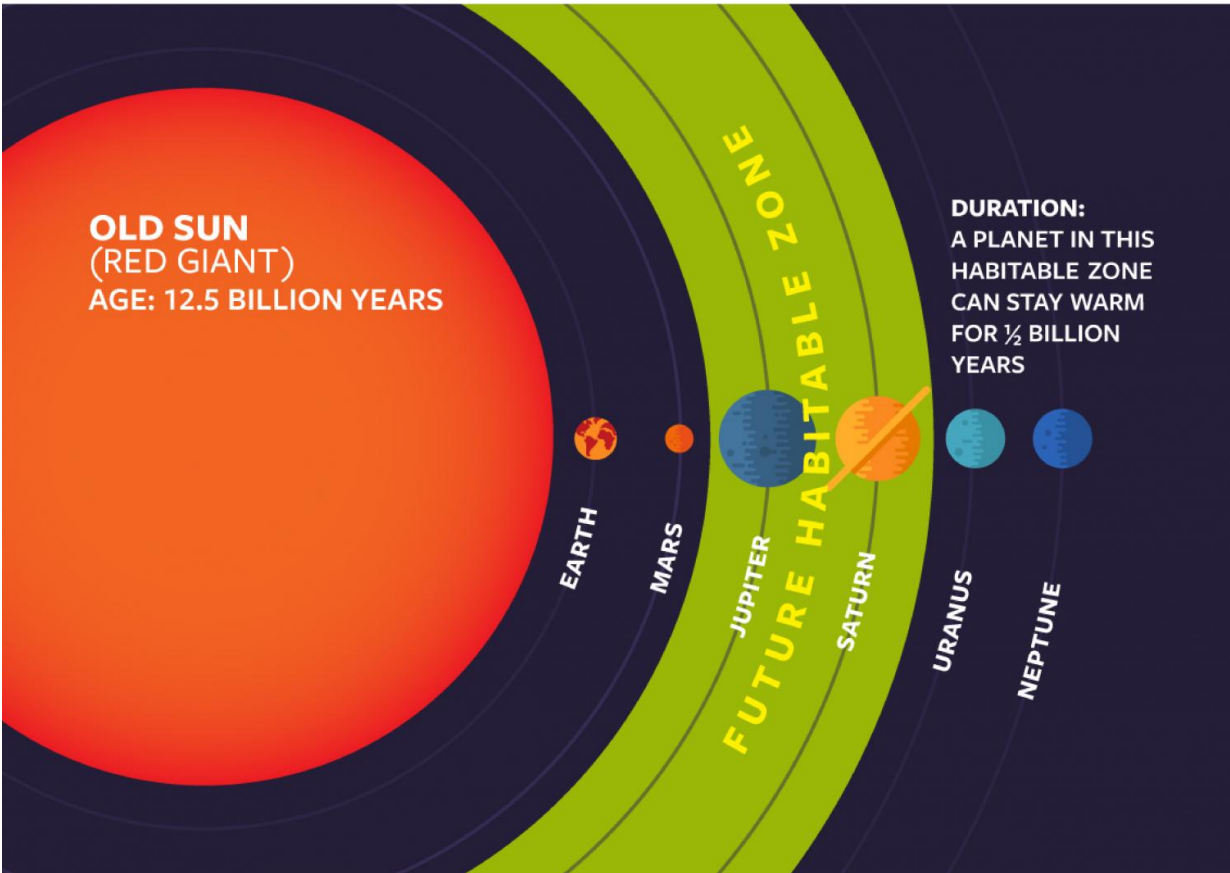
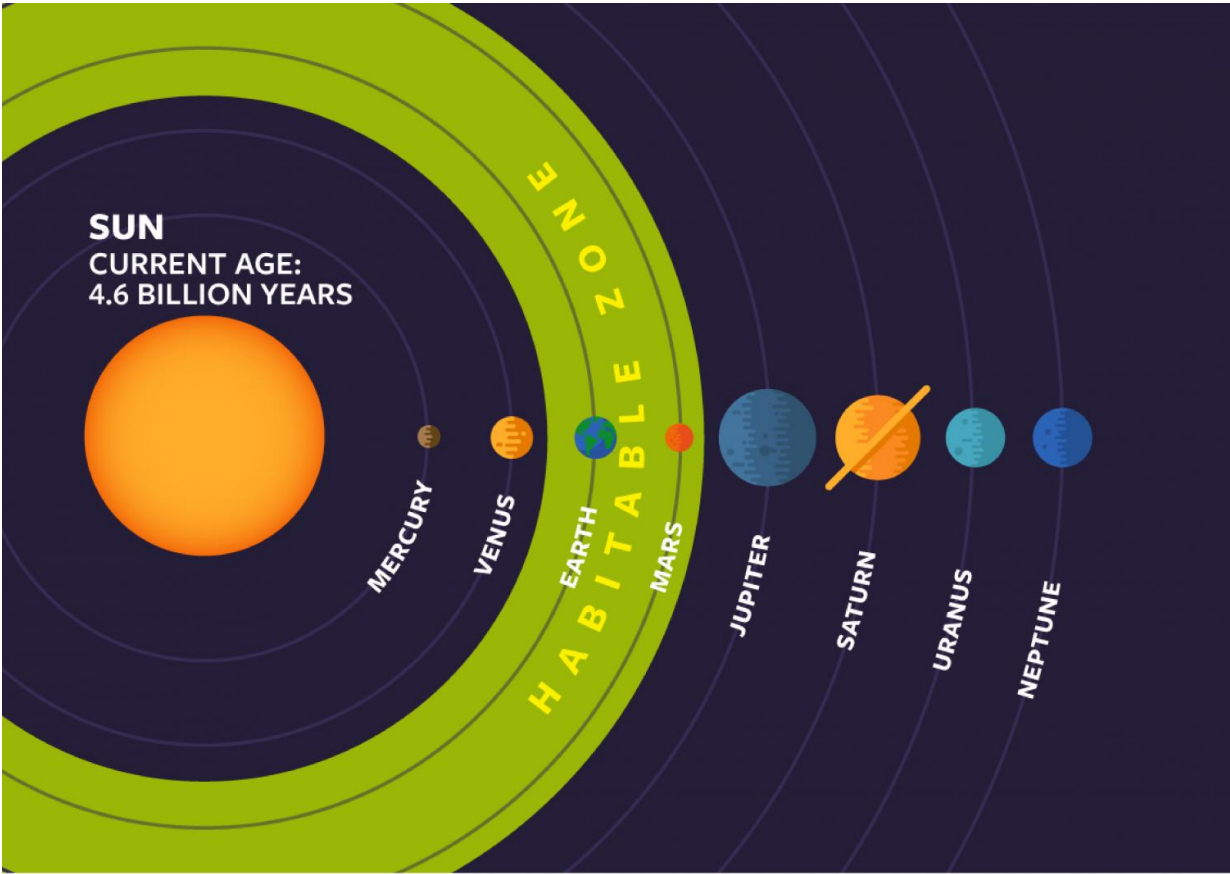


# Hunting for hidden life on worlds orbiting old, red stars

May 16 2016

---



This graphic shows where a planet can be habitable and warm around our sun, as it ages over billions of years. Credit: Cornell University

All throughout the universe, there are stars in varying phases and ages. The oldest detected Kepler planets (exoplanets found using NASA's Kepler telescope) are about 11 billion years old, and the planetary diversity suggests that around other stars, such initially frozen worlds could be the size of Earth and could even provide habitable conditions once the star becomes older. Astronomers usually looked at middle-aged stars like our sun, but to find habitable worlds, one needs to look around stars of all ages.

In their work, Ramses M. Ramirez, research associate at Cornell's Carl Sagan Institute and Lisa Kaltenegger, associate professor of astronomy and director of the Carl Sagan Institute, have modeled the locations of the [habitable zones](#) for aging [stars](#) and how long [planets](#) can stay in it. Their research, "Habitable Zones of Post-Main Sequence Stars," is published in the *Astrophysical Journal* May 16.

The "habitable zone" is the region around a star in which water on a planet's surface is liquid and signs of life can be remotely detected by telescopes.

"When a star ages and brightens, the habitable zone moves outward and you're basically giving a second wind to a planetary system," said Ramirez. "Currently objects in these outer regions are frozen in our own solar system, and Europa and Enceladus - moons orbiting Jupiter and Saturn - are icy for now."

Dependent upon the mass (weight) of the original star, planets and their moons loiter in this red giant habitable zone up to 9 billion years. Earth, for example, has been in our sun's habitable zone so far for about 4.5 billion years, and it has teemed with changing iterations of life.

However, in a few billion years our sun will become a red giant, engulfing Mercury and Venus, turning Earth and Mars into sizzling rocky planets, and warming distant worlds like Jupiter, Saturn and Neptune - and their moons - in a newly established red giant habitable zone.

"Long after our own plain yellow sun expands to become a red giant star and turns Earth into a sizzling hot wasteland, there are still regions in our solar system - and other solar systems as well - where life might thrive," says Kaltenegger.

"For stars that are like our sun, but older, such thawed planets could stay warm up to half a billion years in the red giant habitable zone. That's no small amount of time," said Ramirez, who is the lead author of the study.

"In the far future, such worlds could become habitable around small red suns for billions of years, maybe even starting life, just like Earth. That makes me very optimistic for the chances for life in the long run," said Kaltenegger.

**More information:** "Habitable Zones of Post-Main Sequence Stars," Ramses M. Ramirez & Lisa Kaltenegger, 2016 May 16, *Astrophysical Journal* Preprint: [cornell.app.box.com/v/habitabl ... 342293/65288426425/1](http://cornell.app.box.com/v/habitabl...342293/65288426425/1)

Provided by Cornell University

Citation: Hunting for hidden life on worlds orbiting old, red stars (2016, May 16) retrieved 26 April 2024 from <https://phys.org/news/2016-05-hidden-life-worlds-orbiting-red.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.