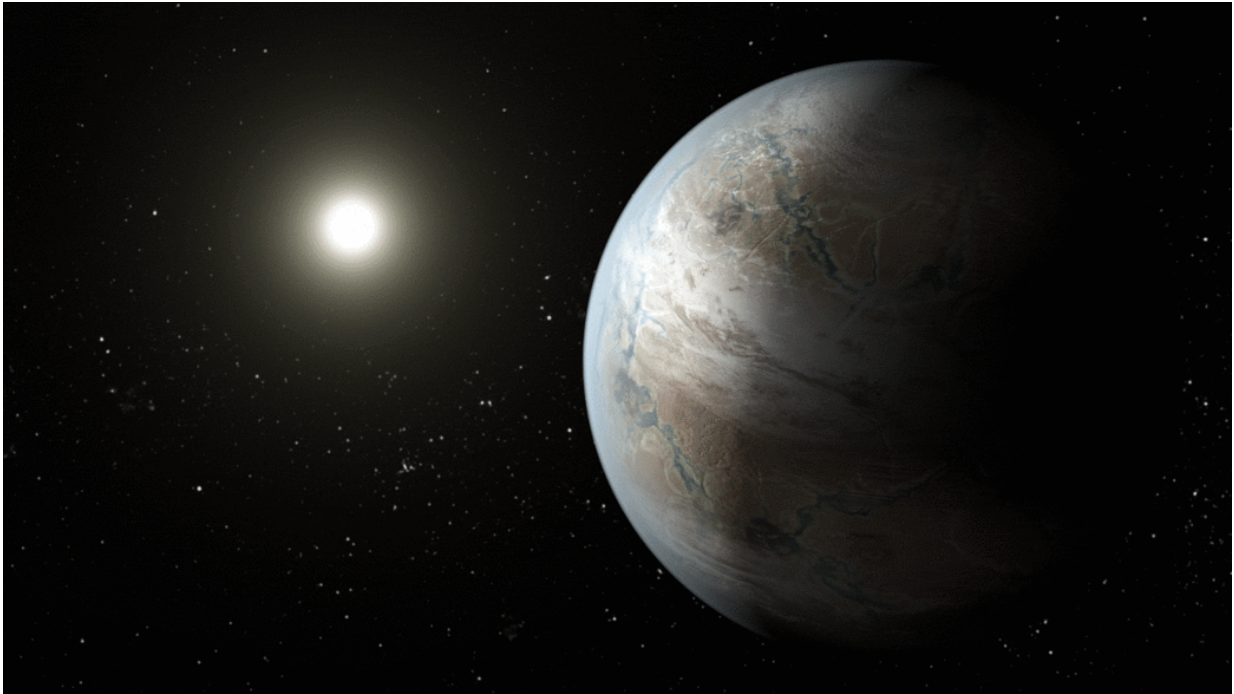


# How many habitable planets are out there?

October 29 2020

---



This illustration depicts one possible appearance of the planet Kepler-452b, the first near-Earth-size world to be found in the habitable zone of a star similar to our Sun. Credit: NASA Ames/JPL-Caltech/T. Pyle. Source: A Spin Around An Exoplanet Most Like Earth

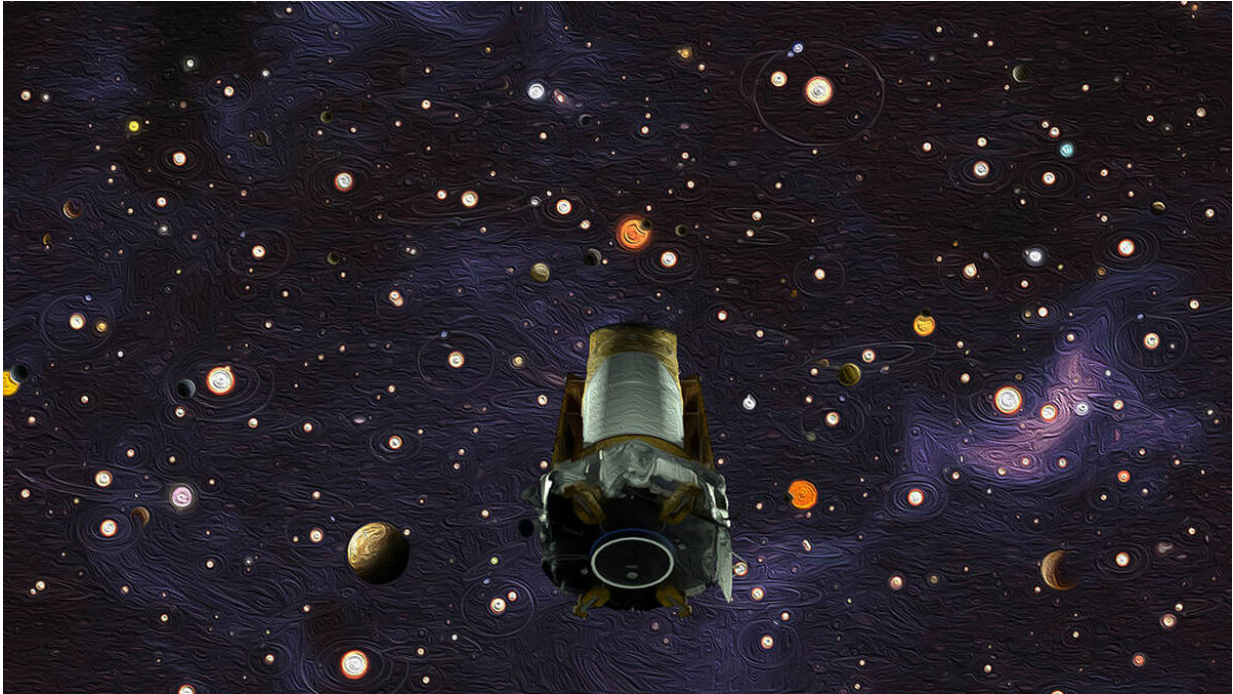
Thanks to new research using data from the Kepler space telescope, it's estimated that there could be as many as 300 million potentially habitable planets in our galaxy. Some could even be pretty close, with several likely within 30 light-years of our Sun. The findings will be

published in *The Astronomical Journal*, and research was a collaboration of scientists from NASA, the SETI Institute, and other organizations worldwide.

"This is the first time that all of the pieces have been put together to provide a reliable measurement of the number of potentially habitable [planets](#) in the galaxy," said co-author Jeff Coughlin, an exoplanet researcher at the SETI Institute and Director of Kepler's Science Office. "This is a key term of the Drake Equation, used to estimate the number of communicable civilizations—we're one step closer on the long road to finding out if we're alone in the cosmos."

The Drake Equation is a probabilistic argument that details the factors to consider when estimating the potential number of technologically advanced civilizations in the galaxy that could be detected. The Drake Equation is also often considered to be a roadmap for astrobiology and guides much of the research at the SETI Institute.

To develop a reasonable estimate, the researchers looked at exoplanets similar in size to Earth and thus most likely to be rocky planets. They also looked at so-called Sun-like [stars](#), around the same age as our Sun and approximately the same temperature. Another consideration for habitability is whether the planet could have the conditions necessary to support liquid water.



An illustration representing the legacy of NASA's Kepler space telescope. After nine years in deep space collecting data that revealed our night sky to be filled with billions of hidden planets—more planets even than stars—NASA's Kepler space telescope ran out of fuel needed for further science operations in 2018. Credit: NASA/Ames Research Center/W. Stenzel/D. Rutter. Source: A New View of Our Starry Night

Previous estimates about determining the number of potentially habitable exoplanets there are in our galaxy were heavily based on the planet's distance from its star. This new research also considers how much light hits the planet from its star, which would impact the likelihood that the planet could support liquid water. To do this, the team looked not only at Kepler data, but also at data from the European Space Agency's Gaia mission about how much energy the planet's star emits.

By taking both Kepler and Gaia data into account, the results better

reflect the diversity of stars, solar systems, and exoplanets in our galaxy.

"Knowing how common different kinds of planets are is extremely valuable for the design of upcoming exoplanet-finding missions," said co-author Michelle Kunimoto, who worked on this paper after finishing her doctorate on exoplanet occurrence rates at the University of British Columbia, and recently joined the Transiting Exoplanet Survey Satellite, or TESS, team at the Massachusetts Institute of Technology in Cambridge, Massachusetts. "Surveys aimed at small, potentially habitable planets around Sun-like stars will depend on results like these to maximize their chance of success."

More research will be needed to understand the role a planet's atmosphere has on its capacity to support liquid water. In this analysis, researchers used a conservative estimate of the atmosphere's effect to estimate the occurrence of Sun-like stars with rocky planets that could have liquid water.

The Kepler mission, which officially ceased collecting data in 2018, has identified over 2,800 confirmed exoplanets, with several thousand more candidates waiting to be confirmed. So far, researchers have identified several hundred planets in the habitable zone of their star in Kepler data. It may take a while to find all 300 million!

**More information:** Steve Bryson et al, The Occurrence of Rocky Habitable Zone Planets Around Solar-Like Stars from Kepler Data, *The Astronomical Journal*, arXiv:2010.14812v1, [arxiv.org/abs/2010.14812](https://arxiv.org/abs/2010.14812)

Provided by SETI Institute

Citation: How many habitable planets are out there? (2020, October 29) retrieved 24 April 2024

from <https://phys.org/news/2020-10-habitable-planets.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.