From the comfort of home, Web users may have found new planets

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"Planet Hunters" from around the globe have used real NASA data to identify two potential planets orbiting stars beyond our solar system. Credit: Michael Marsland, Yale University

Since the online citizen science project Planet Hunters launched last December, 40,000 web users from around the world have been helping professional astronomers analyze the light from 150,000 stars in the hopes of discovering Earth-like planets orbiting around them.

Users analyze real scientific data collected by NASA's Kepler mission, which has been searching for planets beyond our own solar system — called exoplanets — since its launch in March 2009.

Now astronomers at Yale University have announced the discovery of the first two potential exoplanets discovered by Planet Hunters users in a

new study to be published in the *Monthly Notices of the Royal Astronomical Society*.

"This is the first time that the public has used data from a NASA space mission to detect possible planets orbiting other stars," said Yale astronomer and exoplanet expert Debra Fischer, who helped launch the Planet Hunters project.

The candidate planets orbit their host stars with periods ranging from 10 to 50 days – much shorter than the 365 days it takes the Earth to orbit the Sun – and have radii that range in size from two-and-a-half to eight times Earth's radius. Despite those differences, one of the two candidates could be a rocky planet similar to the size of the Earth (as opposed to a giant gas planet like Jupiter), although they aren't in the so-called "habitable zone" where liquid water, and therefore life as we know it, could exist.

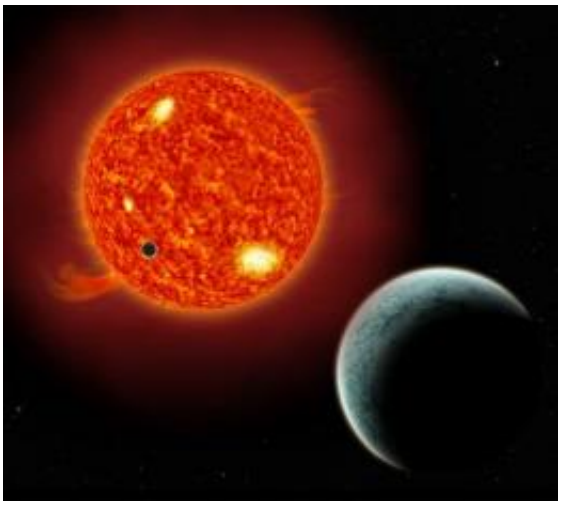
Next, the Planet Hunters team— a collaboration between astronomers at Yale, the University of Oxford and the Adler Planetarium in Chicago— used the Keck Observatory in Hawaii to analyze the host stars. "I think there's a 95 percent chance or greater that these are bona fide planets," Fischer said.

The Kepler team has already announced the discovery of 1200 exoplanet candidates and will follow up on the highest potential ones with further analysis, but they had discarded the two found by Planet Hunters users for various technical reasons that led them to believe they weren't promising candidates.

"These three candidates might have gone undetected without Planet Hunters and its citizen scientists," said Meg Schwamb, a Yale researcher and Planet Hunters co-founder. "Obviously Planet Hunters doesn't replace the analysis being done by the Kepler team. But it has proven

itself to be a valuable tool in the search for other worlds."

Users found the two candidates in the first month of Planet Hunters operations using data the Kepler mission made publicly available. The Planet Hunters team sent the top 10 candidates found by the citizen scientists to the Kepler team, who analyzed the data and determined that two of the 10 met their criteria for being classified as planet candidates. The two candidates were flagged as potential planets by several dozen different Planet Hunters users, as the same data are analyzed by more than one user.



This is an artist's rendition of a planet transiting in front of the star. The more distant planet has not yet been detected, but most stars with low mass planets have additional planets. Credit: Image courtesy of Yale University

"Scientists on the Kepler team obtained the data, but the public helped finance the project with their tax dollars," Fischer said. "It's only right that this data has been pushed back into the public domain, not just as scientifically digested results but in a form where the public can actively participate in the hunt. The space program is a national treasure—a

monument to America's curiosity about the Universe. It is such an exciting time to be alive and to see these incredible discoveries being made."

Planet Hunters users are now sifting through the next 90 days of Kepler data in the hopes of adding to the count. "This is what we found after just a preliminary glance through the first round of Kepler data," Fischer said. "There's no doubt that, with each new round of data, there will be more discoveries to come."

More information: Learn more about Planet Hunters at www.planethunters.org

Provided by Yale University