

Kepler spacecraft rakes in nearly 1,300 planets

New statistical method quickly checks the status of planetary candidates.

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NASA Ames/JPL-Caltech/Tim Pyle

NASA's Kepler telescope has found thousands of planets outside of the Solar System since 2009.

The latest batch of planets spotted by [NASA's Kepler space telescope](#) is its biggest yet: 1,284 newfound worlds beyond the Solar System. The discoveries — which more than double Kepler's total planetary haul — were made possible by a new statistical method that can quickly analyse whether a signal is a bona fide planet or a false alarm.

"It's really exciting because now we have more planets to play with," says Lisa Kaltenegger, an astronomer at Cornell University in Ithaca, New York.

The haul includes nine worlds in [the habitable zones of their stars](#) — the realm in which liquid water and, potentially, extraterrestrial life could exist. Kepler has now found 21 planets that are roughly Earth analogues — those that lie in the habitable zones of their stars and are no bigger than twice the size of Earth. "It is showing us the first hint of the diversity of worlds out there," Kaltenegger says.

Timothy Morton, an astronomer at Princeton University in New Jersey, and his colleagues report the new planets in *The Astrophysical Journal*¹.

Speedy software

Kepler raked in [thousands of candidate planets](#) between 2009 and 2013, when it stared at a patch of sky and looked for the temporary dimming caused when a planet moves in front of its star. But other phenomena, such as two stars orbiting one another, can produce the same sort of signal. Astronomers have had to laboriously investigate each of the Kepler candidate signals, usually one at a time, by watching the stars using ground-based telescopes.

Morton's team developed a method for sorting through the candidate planets using a software package known as Vespa. It calculates the likelihood that a planetary-looking signal could be caused by something other than a real planet.

The team used Vespa to analyse sightings of more than 7,000 possible planets. Along with the 1,284 new discoveries, the researchers also found planets that had been confirmed previously by other methods. They left more than 2,000 sightings in the "candidate" category because they could not confirm them at a 99% or greater level of confidence.

False positives

Other astronomers have previously developed search programmes to sift through Kepler candidate planet signals. The Vespa system is much faster because it is fully automated and takes just a few minutes per candidate, Morton says. The code is open-source and is being used by other teams on their own planetary candidates.

“In the early years we were really plagued by false alarms,” says Natalie Batalha, Kepler’s mission scientist at the NASA Ames Research Center in Moffett Field, California. One recent study estimated that as many as half of the gas-giant candidates — a relatively small percentage of Kepler’s work, which focuses on smaller rocky planets — could be false positives². The Vespa work is helping scientists to be more confident in the planets they do confirm, Batalha says.

Kepler [briefly entered emergency mode last month](#) but has now resumed its planet-hunting work.

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References

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2. Santerne, A. *et al. Astron. Astrophys.* **587**, A64 (2015).