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Artistic impression of the surface of a planet with multiple moons extrasolar

[Finding Extrasolar Moons](#)

Astronomers are searching for techniques to find extrasolar moons

Until now, several hundred planets have been found orbiting around nearby stars while the number of moons remained at a constant zero. It's not that they're not there, it's just that we can't see them with today's technology. To put it even simpler, the smallest planet ever found was a terrestrial one, at least three times the mass of the Earth, but finding a moon today is more like finding a specific molecule of water inside an ocean. An even more eloquent example would be that of the Voyager I spacecraft, which, while within the solar system, at a distance of about 6 billion kilometres, pointed its cameras towards Earth. Although Earth is there, the Moon is nowhere to be found. This doesn't mean however that finding extrasolar moons is an impossible task, we just have to look for the right technique to do so. "It will add a periodic component to the combined infrared signal" of the planet-moon system said Darren Williams, associate professor of physics and astronomy at Penn State Erie. Finding exoplanets is extremely interesting, no doubt about it, but their moons may present even more interest. Some could even bear life or determine life to appear on their planet. "We certainly owe our present climate stability to the Moon and its stabilizing influence on the spin axis, but I'm not convinced that big moons are a requirement for simple or advanced life. I do think that Earth would have evolved advanced life even with greater seasonal extremes, but it may have taken a different evolutionary path", said Williams. Computer models created by Williams and involving a planet-moon system similar to that of the Earth, although with moons of various sizes, revealed that the signature of the moon may appear in the infrared spectrum. Anyone looking for such a body would most likely have to look for the infrared signature of the respective system, which would be altered by the high surface temperature of the moon. But before finding a moon, we still have to find a planet resembling ours. The ESA's Darwin and NASA's Terrestrial Planet Finder missions will see to this task. "The present goal is to build instruments capable of seeing something as large as the Earth or possibly Mars. Smaller Mercury- or Titan-sized objects fall below that first-order threshold", Williams said. If the moons were big enough they could even be directly observable in which case the task would become infinitely easier if the detection was made while the planet-moon system transited the front of the mother star. And if this didn't do the job, that other visible light and infrared ground-based observations should. "Water is extremely dark in the infrared except when the light reflects from the surface at a glancing angle", said Williams. This is mostly visible when the respective planet is in a crescent phase and could also be used to map the thermal output of the planet to create a map of the surface. Investigations were set to start with Earth this year, when ESA's Mars Express spacecraft should make observations on the crescent of our planet.