



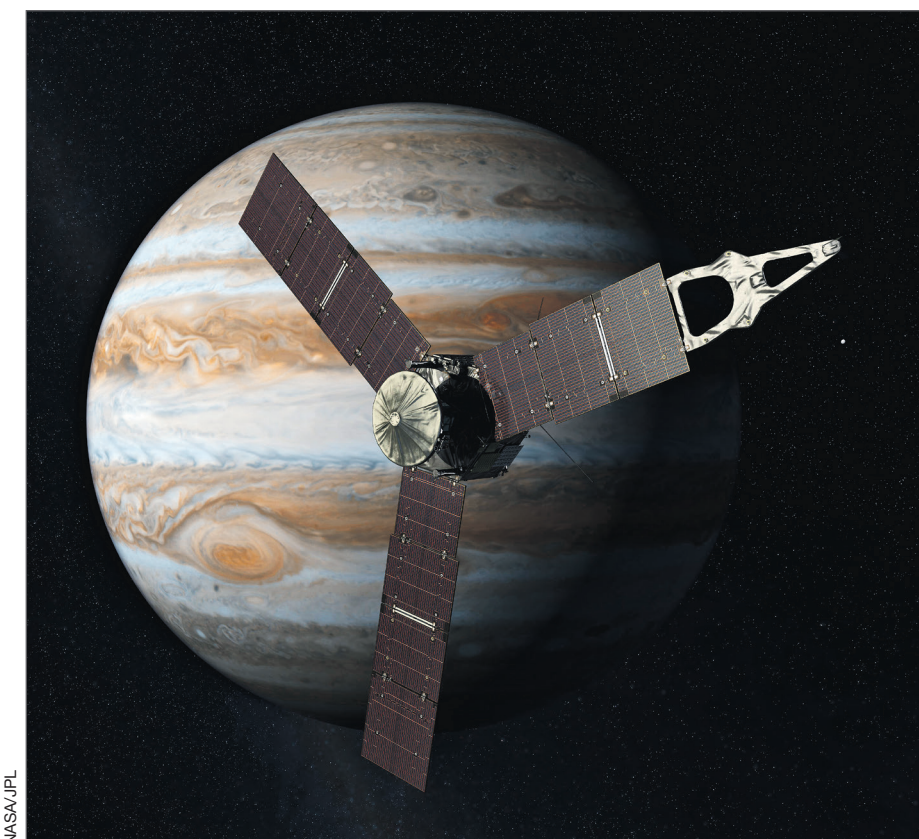
NASA/JPL-CALTECH/SWIRI/MSS IMAGE PROCESSING BY KEVIN M. GILL (CC BY)

Touring Jupiter

NASA's Juno mission sent back some amazing photos of this giant planet.

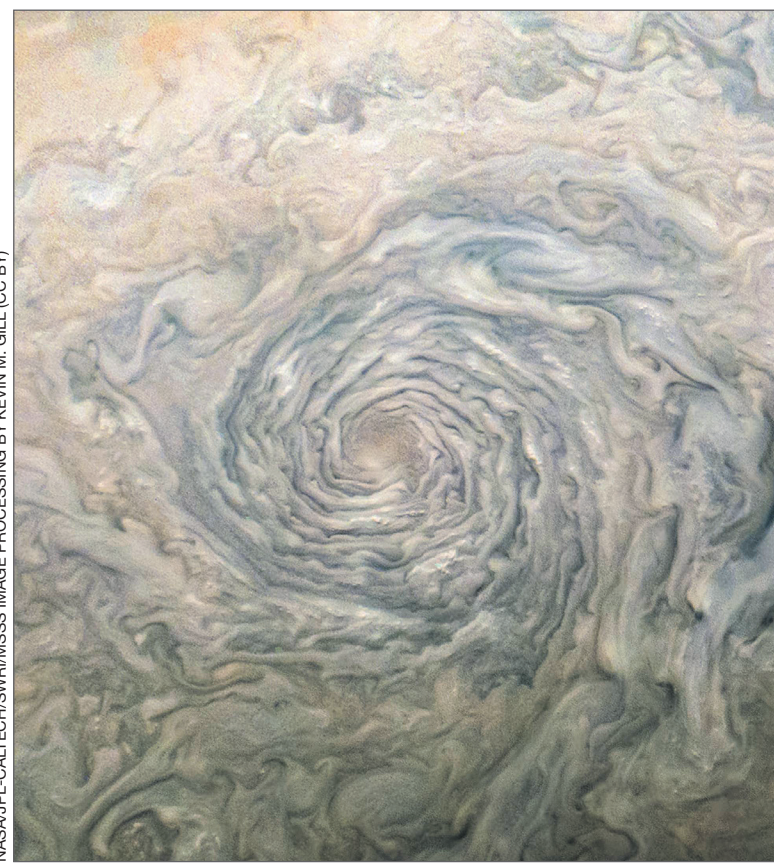
Jupiter is the largest planet in the solar system. It is named after the king of the ancient Roman gods. The National Aeronautics and Space Administration (NASA) received these **astounding** images from its Juno spacecraft, which is orbiting Jupiter.

— By NG SOCK LING



The Juno spacecraft was launched from Earth in 2011. Since arriving at Jupiter in 2016, it has been studying this fascinating planet. Scientists hope that this study will help us know more about how Jupiter and the solar system formed and **evolved**. Jupiter contains twice as much material as all the planets, moons, comets, and asteroids in the solar system combined. If it were much bigger, it would have been considered as a star.

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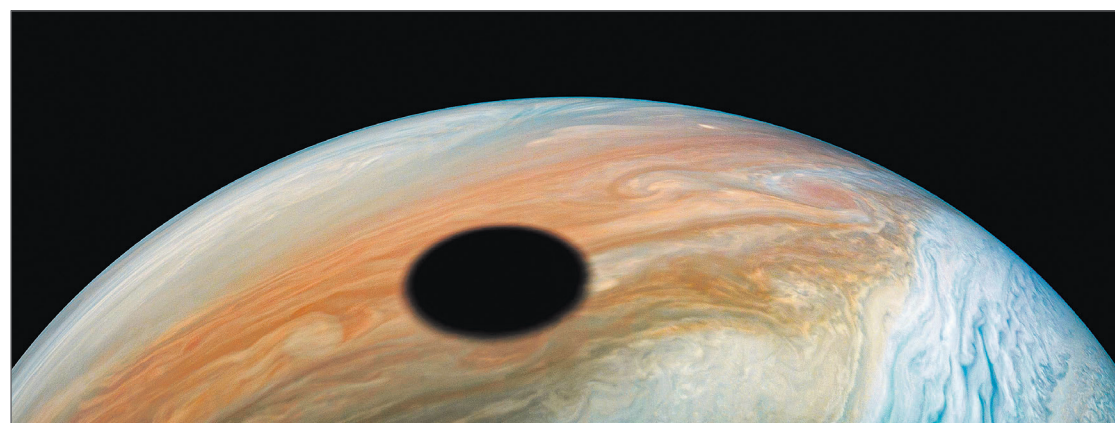
↑ The tops of Jupiter's clouds swirl in **elaborate** patterns in this colour-enhanced photo taken by the Juno mission. Plumes of gases containing sulfur and phosphorus rise from Jupiter's warmer interior, contributing to the colours. The clouds higher up in the atmosphere appear as white swirls, while the darker colours mark the clouds deeper below.

← A detailed look at a cyclonic storm in Jupiter's atmosphere. In a cyclonic storm, the winds rotate in spirals, meeting in the centre of the cyclone.

VOCAB BUILDER

- astounding** (say "es-to-ni-shing"; adjective) = very surprising and impressive.
- elaborate** (say "ee-la-bo-ret"; adjective) = detailed.
- evolved** (say "ee-volv'd"; verb) = developed gradually

→ As it passes in front of the Sun, Jupiter's moon Io casts its shadow over the giant planet. Such solar eclipses happen quite frequently on Jupiter, as this planet has more than 70 moons.



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Why is Jupiter's sky not blue?

Some planets in our solar system have blue skies. Others do not. Scientist JAKE CLARK explains why.

The atmosphere is normally the outermost layer of a planet. On rocky worlds like Earth, it is usually the lightest and thinnest layer. The thing that makes an atmosphere an atmosphere is what it's made of. It's not made up of big lumps of rocks or huge swirling oceans; it is made up of gases.

What's in an atmosphere?

Atmospheres can contain a wide variety of gases. Most of Earth's atmosphere is a gas called nitrogen that doesn't really react with anything. There's also a fair bit of oxygen, which is what we need to breathe. There are also two other important gases called argon and carbon dioxide, and tiny amounts of lots of other ones.

The mix of gases is what gives a planet's atmosphere its colour. Earth's atmosphere is made up of gases that tend to bounce blue light in all directions (known as "scattering") but let most other colours of light straight through. This scattered light is what gives Earth's atmosphere its blue colour.

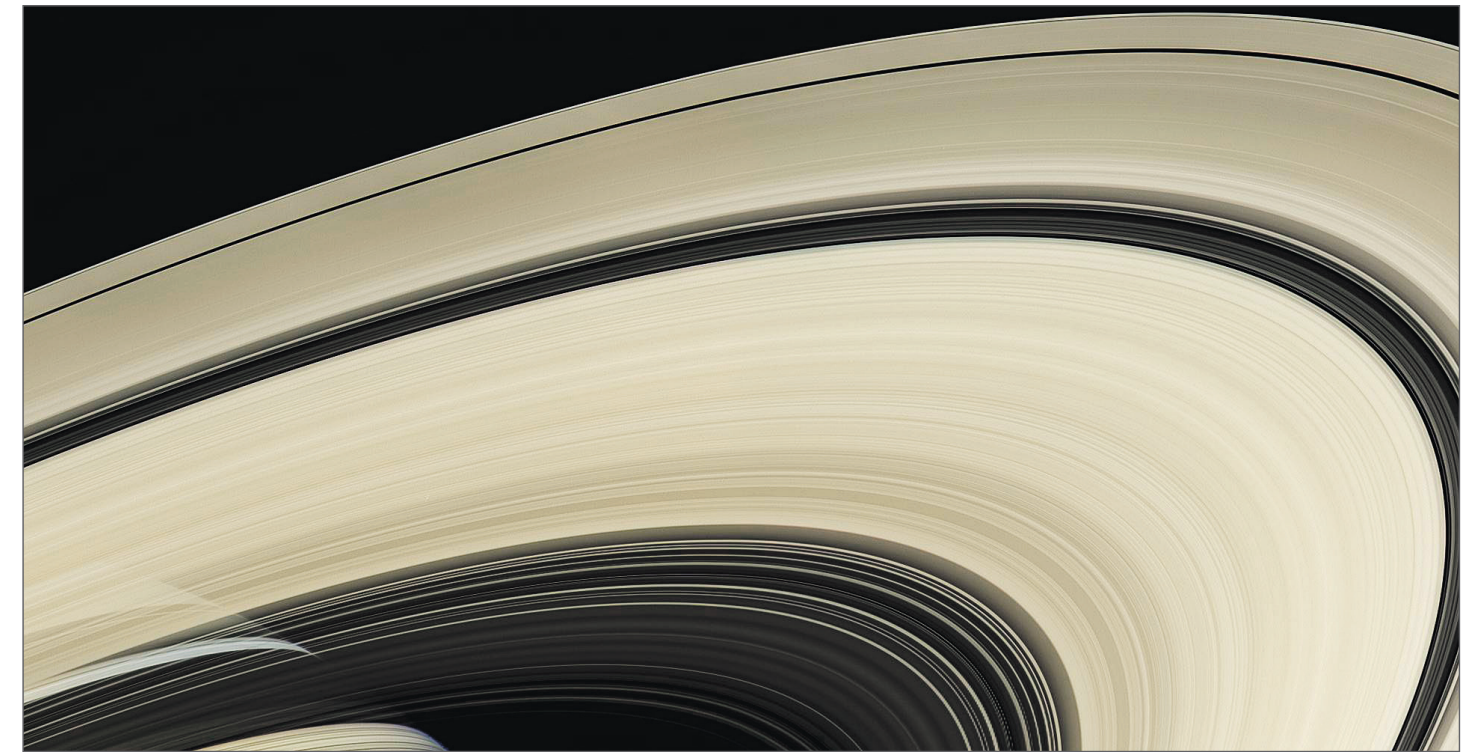
Do other planets have blue atmospheres? Some of them sure do!

Other worlds

The atmospheres of the two ice giants in our solar system, Neptune and Uranus, are both beautiful shades of blue. However, these atmospheres are a different blue than ours. It's caused by the huge amounts of a gas called methane swirling around. (Side note: methane is also the main component of farts. That's right, there's a layer of farts on Uranus.)

Jupiter and Saturn, however, have completely different-coloured atmospheres. Ice crystals made of a chemical called ammonia in Saturn's upper atmosphere make it a pale shade of yellow. Uranus' atmosphere also contains some ammonia, which makes the planet a slightly greener shade than the deep blue we see on Neptune.

Jupiter's atmosphere has **distinctive** brown



Saturn's rings captured on camera by spacecraft Cassini Orbiter. A chemical called ammonia in Saturn's upper atmosphere makes it a pale shade of yellow.

NASA/JPL-CALTECH/SPACE SCIENCE INSTITUTE

and orange bands, thanks to gases that may contain the elements phosphorus and sulfur, and possibly even more complicated chemicals called hydrocarbons.

In some extreme cases, the entire planet might just be a huge atmosphere with no rocky surface at all. **Astronomers** and planetary scientists like myself are still trying to work out whether Jupiter and Saturn have rocky surfaces, deep down in their atmosphere, or whether they're both simply huge balls of gas.

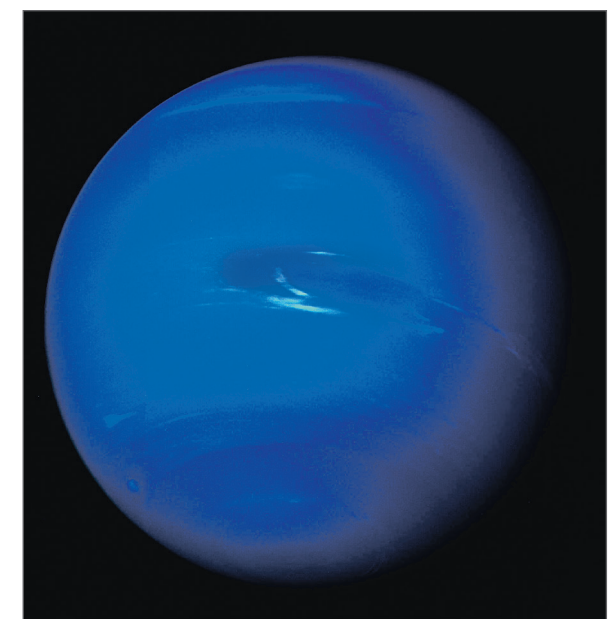
However, there are some planets that have no atmosphere at all! The Sun's closest and smallest neighbour, Mercury, is one example. Its surface is exposed to the **vastness** of space.

Beyond our solar system

So far, I've been talking about the atmospheres of planets in our Solar system. But, what about planets in other planetary systems, orbiting other stars? Well, astronomers have been detecting the atmospheres of these planets (which we call "exoplanets") for the past 20 years! It wasn't until last year, however, that astronomers managed to detect the atmosphere of a rocky exoplanet. The planet is called LHS 3844b and it's so far away that the light takes almost 50 years to reach us!

LHS 3844b weighs twice as much as Earth, and we astronomers thought it would have a pretty thick atmosphere. But, to our surprise, it has little to no atmosphere at all! So, it might be more like Mercury than Earth.

We still have a lot to learn about far-off planets and discovering one with an Earth-like atmosphere that's ripe for life is still many years away.



The atmosphere of Neptune is a beautiful blue, although a different blue than ours. It is caused by a gas called methane.

NASA/JPL

VOCAB BUILDER

- distinctive** (say "dis-tink-tiv"; adjective) = a special quality of someone or something that makes it different from others.
- astronomers** (say "as-traw-no-merz"; noun) = experts in astronomy, which is the study of objects in space.
- vastness** (say "vast-nes"; noun) = the great extent of something.

— JAKE CLARK is a PhD student in the University of Southern Queensland. This story first appeared at <https://theconversation.com/>