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NASA/JPL/UNIV. ARIZONA

Impact craters and atmospheric history on Mars provide information on how terrestrial planets form and evolve.

Exoplanet science 2.0

The study of life on and off Earth needs unified funding and a coherent plan, say **Caleb Scharf**, **Debra Fischer** and **Victoria Meadows**.

It is more than two decades since we learnt that the Universe is awash with other worlds. Since 1992, more than 3,500 exoplanets have been discovered orbiting stars other than our Sun.

The range of systems is dazzling. There is at least one planet around any star that, like the Sun, is powered by fusing hydrogen into helium. Sixty per cent of such stars harbour 'super-Earths' — rocky worlds that are more massive than ours but smaller than Neptune. One in six of these stars has an Earth-sized planet in an orbit that is tighter than Mercury's around the Sun[1].

This plethora of rocky planets raises a big question: is life common in the Universe? Even in our Solar System, there are plenty of places where organisms could potentially survive, such as in the oceans of liquid water beneath the frozen surfaces of Jupiter's satellite Europa and Saturn's moon Enceladus. Four billion years ago, life may have thrived on a warmer Mars.

Within a decade or two, we might find traces of extraterrestrial life in our Solar System. The Mars 2020 and ExoMars 2020 rovers are set to probe the Martian surface in that year. NASA's Europa Clipper and the European Space Agency's Jupiter Icy Moons Explorer (JUICE) ventures will get close to Jupiter's satellites by about 2030. The James Webb Space Telescope will look farther afield, scrutinizing the atmospheres of ▶