BBC

WHY EARTH MIGHT SURVIVE THE SUN'S DEATH

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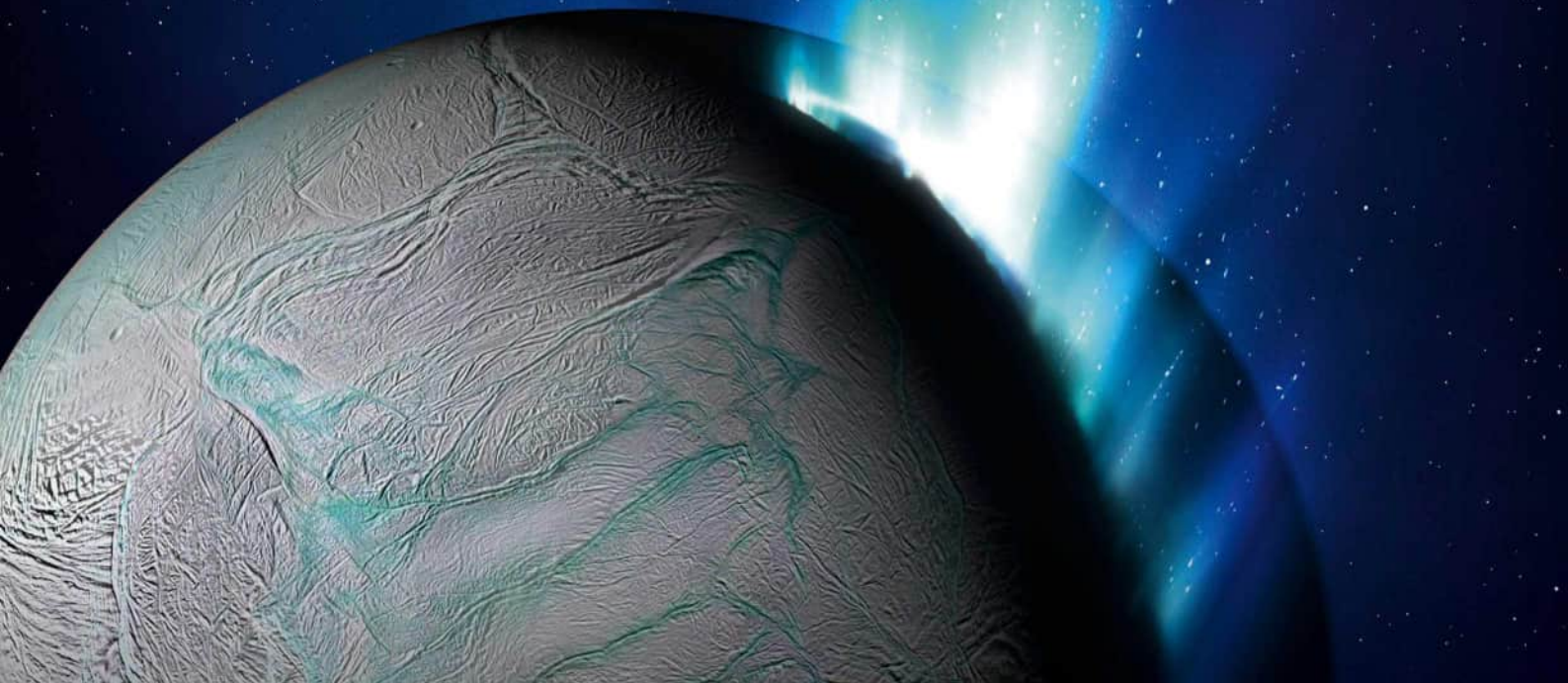
Sky at Night

THE UK'S BEST-SELLING ASTRONOMY MAGAZINE

ALIENS NEXT DOOR?

Scientists see signs of life across the Solar System. Here's where we could discover it first



FROM FICTION TO FACT: HOW SPACE TRAVEL WENT FROM THE PAGE TO THE PLANETS

LONE STAR: WHY IT MATTERS THAT OUR SUN IS SINGLE

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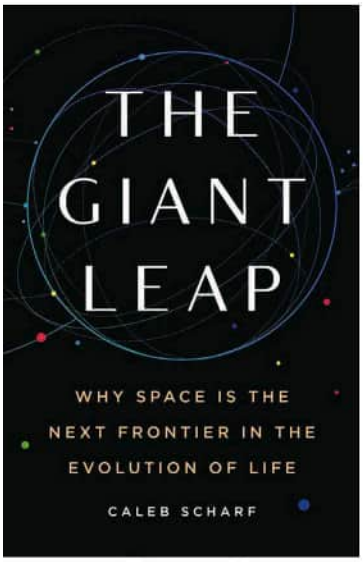
New astronomy and space titles reviewed

BOOKS

The Giant Leap: Why Space is the Next Frontier in the Evolution of Life



Caleb Scharf
Basic Books
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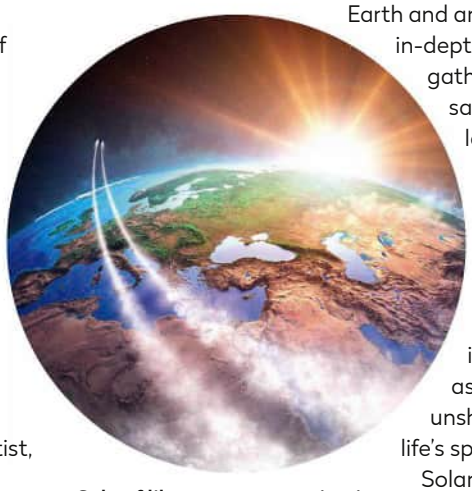
"Earth is the cradle of humanity, but one cannot live in the cradle forever," wrote Konstantin Tsiolkovsky in 1911. The quote has since become something of a mantra for advocates of space exploration who, like that pioneering Russian rocket scientist, envisage a future in which humans inevitably spread across the Solar System and beyond.

This thought-provoking book by NASA astrobiologist Caleb Scharf looks at the realities of how humans (and other Earth life) might achieve this 'dispersal' to become an interplanetary species. The subtitle hints at a simple argument for space colonisation, but happily it's far more than that. It's a journey across the Solar System that draws parallels with the pioneering 1831–36 voyage of HMS Beagle, chronicled by Charles Darwin.

The bulk of the book offers an intriguing new perspective on the history of space exploration and the unique challenges of space environments for machines and humans, from near Earth to the orbits of giant planets and beyond. It's engaging and packed with surprising facts, as well as insights on the influence Earth-based life has already had on the wider Solar System.

Only towards the end does *The Giant Leap* become more speculative, exploring possible habitats beyond Earth and the resources they might require. Scharf envisions machines and humans (or at least our descendants) working hand in hand. He points out how much society benefits from a wealth of data about Earth and argues that similar in-depth information gathered by probes and satellites could make large-scale space exploration a far more practical and sustainable proposition.



Scharf likens our expansion into the Solar System to a Beagle-like voyage of discovery

If one aspect slightly rankles, it's the implicit assumption that, once unshackled from Earth, life's spread across the Solar System is as inevitable as its historic spread across our planet, and that the many undoubted challenges – both in space and from within its cradle – can all be overcome. Nevertheless, this is a fascinating and worthwhile read.

★★★★★

***Giles Sparrow** is a science author, editor and consultant*

TITOONZ, GETTY

Interview with the author
Caleb Scharf

Is space exploration a necessity?

It's made itself a necessity because of what space platforms do for humans – be that satellite imaging, communications or navigation, which are all integral to global economies. Most of the world is dependent on data from space. Exploration transforms our understanding of planets and life itself, but also opens possibilities that could save us from existential risks, and even from ourselves.

If we left Earth, where would we go?

Other planets might not be the best places in the long term, because there's a limit to how Earth-like they can ever be. Asteroids or fully artificial habitats can be engineered to be much more optimal, even in terms of artificial gravity. There's enough material out there to form thousands of biospheres, with trillions of human occupants. It sounds outrageous, but that's because we're not acclimatised to thinking beyond planetary life.

How might a spacefaring human species evolve?

In the near term, not much, except through artificial interventions to keep astronauts healthy. But if we spread across the Solar System, our species – and any species we take with us – will become diluted and exposed to many new conditions. The history of life here on Earth shows this can lead to speciation, the diversification of organisms. In that case, humans would become new species, adapted or changed in ways that are hard to predict.

***Caleb Scharf** is the Senior Scientist for Astrobiology at NASA's Ames Research Center*