From 'Tatooine' to reality: How exoplanet research has translated to science fiction

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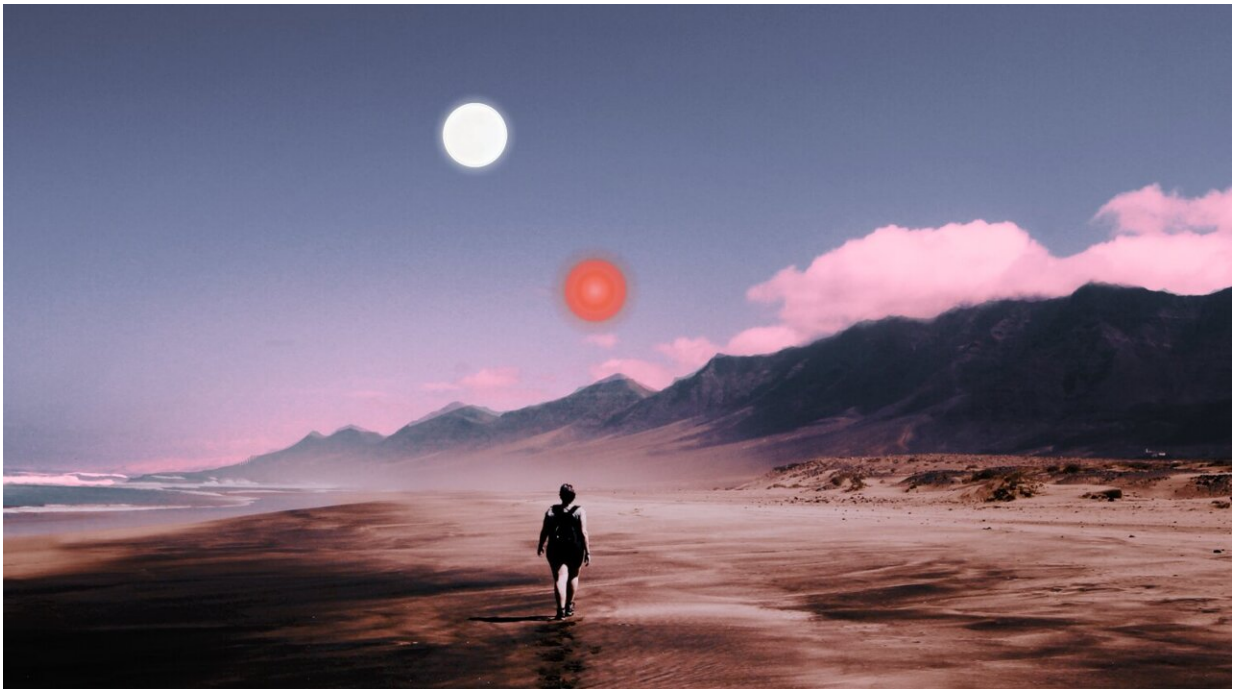

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An astronomy lesson on binary stars could begin with a series of complex diagrams and data or with a clip from the movie Star Wars where Luke Skywalker looks up at the sky of his home planet, Tatooine, and sees two suns shining. Which will more easily awaken the interest of a sleepy high school class?

Science fiction has always captured our attention, and as many scientists claim, it has often been a source of inspiration for their scientific careers. For this reason, it is sometimes used to communicate science to the public, even conveying complex content. While this can be an effective method, it is necessary to understand how actual science is represented by science fiction.

This is what a new paper published in the *Journal of Science Communication—JCOM* has done, using a quantitative methodology capable of analyzing a large corpus of science fiction works (specifically addressing exoplanets), showing that significant changes in scientific knowledge correspond to changes in science fiction literature as well.

Emma Johanna Puranen, a researcher at the St Andrews Centre for Exoplanet Science (University of St Andrews), along with her colleagues at the Centre, Emily Finer and V Anne Smith, and Christiane Helling, Director of the Space Research Institute (IWF) of the Austrian Academy of Sciences, have applied Bayesian network analysis to a corpus of 142 science fiction works, including novels, films, television programs, podcasts, and video games.

For their research, the scientists chose to investigate the representation of extrasolar planets, also called exoplanets. "They're sort of ubiquitous in science fiction. They're everywhere. Most stories that are set in space will eventually have a scene on an exoplanet," explains Puranen. "The other reason for using exoplanets is that there was a huge shift in our scientific understanding in 1995 when the first exoplanet around a sun-like star was discovered."

The Bayesian network methodology allowed for quantitative investigation of a subject matter—science fiction—usually analyzed qualitatively, and often only one work at a time.

In a Bayesian network, the characteristics of the exoplanets portrayed in the selected works are represented as nodes in an interconnected network, allowing us to understand how each node affects the others. In practice, it can be determined if, for example, a planet in a specific work is represented as favorable to life, whether and how strongly that influences another characteristic.

Since the science fiction works analyzed were distributed over a relatively wide time span, before and after 1995, Puranen and colleagues were able to observe that after that date, the representation of exoplanets in science fiction changed.

"Traditionally in science fiction, there have been a high proportion of Earth-like and habitable planets," explains Puranen, and this is obviously sensible since these are cultural products made by humans for other humans. "But what has changed since the discovery of real exoplanets is that the fictional exoplanets have actually become a bit less Earth-like."

Indeed, the large numbers of exoplanets actually observed by science to date contain a vast majority of planets very different from ours, and very rarely positioned in what scientists define as the habitable zone, where conditions are potentially friendlier to life as we know it. This scientific reality, comments Puranen, has percolated into science fiction representation.

"I can speculate that maybe authors of science fiction are reading all these headlines about worlds that are covered in lava or where it's raining diamonds, which you see in the media," comments the researcher.

"I do think science fiction is responsive to discoveries in science. I think it's sort of reflective of what was going on in science at the time that it was written," concludes Puranen. "So I do think it could be incorporated into science communication in terms of providing a jumping-off point.

It can introduce concepts to people."

More information: Emma Johanna Puranen et al, Science fiction media representations of exoplanets: portrayals of changing astronomical discoveries, *Journal of Science Communication* (2024). DOI: 10.22323/2.23010204

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