

New study examines the links between science fiction and astronomy

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Dr. Kip Thorne made it clear that black is not the primary hue of black holes. His guidance offered to Nolan raised science fiction to a new level. Credit: Paramount Pictures/Warner Bros.

"Today's science fiction is tomorrow's science fact." This quote, attributed to Isaac Asimov, captures science's intricate relationship with science fiction. And it is hardly a one-way relationship.

Whereas [science fiction](#) is constantly evolving to reflect new scientific discoveries and theories, science itself has a long history of drawing inspiration from the works of visionary authors, filmmakers, and popular culture. And in some cases, where scientists themselves were the visionaries (like Asimov himself), you had an instance of both.

The relationship between the two was the subject of a recent study by Samuel Boissier, a researcher with the Center National de la Recherche Scientifique (CNRS) and the director of research at the Laboratoire d'astrophysique de Marseille (LAM). The study is [published](#) on the *arXiv* preprint server.

In an age when misinformation, "deepfakes," and deliberate attempts to obscure scientific truths are at an all-time high, examining the interconnection between science, art, and science fiction is very important. According to Boissier, doing so offers people in the scientific community a way to engage with the public in a way that is relatable and accessible.

The relationship between science fiction and scientific fact is well-documented and has been the subject of academic research. Recent examples (that we have written about) include how exoplanets are depicted, the lives of many professional scientists, and popular depictions of space travel.

However, when a concept fails to meet the burden of proof—such as FTL travel using wormholes or the EMDrive—the typical reaction is to label it as "science fiction." Nevertheless, science fiction authors are often professional scientists themselves or represent science accurately in their stories—hence the term "hard SF."

Inspiring SF (and vice versa)

In his paper, Boissier (himself a professional astronomer and astrophysicist) addresses how hard science fiction can be used for educational purposes, particularly in astronomy and astrophysics. What's more, examples can be found in many forms of popular media, including literature, film, and video games. As he told Universe Today via email:

"Science fiction is using astronomy to offer to the public blockbusters at the movies (e.g., *Interstellar*), series or movies in streaming media ('*Don't Look Up*,' '*The Expanse*'), many books from classic authors (Isaac Asimov, Arthur C. Clarke) or more modern ones (Kim Stanley Robinson), comics (the adventures of *Valerian and Laureline*), or video games (*Mass Effect*, *No Man's Sky*) that have a very large cumulated audience.

"Astronomers can use science fiction to illustrate physics or astronomical facts. It might be a good way to talk about our work and our methods by comparing them to examples with which a large audience is familiar."

Not only do the following examples contain "hard" science, but they also explore concepts that individuals may not otherwise be familiar with. For instance, the *Mass Effect* series contains one of the more well-known proposed resolutions to Fermi's paradox, the berserker hypothesis (or "killer probe scenario").

The *Expanse* series (the novels and the miniseries adaptation) is renowned for featuring scientific elements that make the story compelling and realistic. Examples include realistic depictions of life on Mars, larger asteroids, and spacecraft, including the effects of low gravity (and microgravity).

In terms of literature, Asimov and Clarke are well-known examples of scientists who used the genre to explore speculative ideas grounded in

science. Asimov's "I, Robot" series explored how the development of artificial intelligence (AI) would affect our society.

Interestingly enough, Asimov wrote the series to address what he felt was the tired and cliched trope of robot uprisings ("kill all humans" and such). Strangely, the novel was adapted into the 2004 film starring Will Smith, which centered on the premise of a robot uprising (what bitter irony.)

Clarke's work earned him the nickname "the prophet of the future," a well-deserved moniker. In *Islands in the Sky* (1952), he presented the concept of a space elevator (named Port Goddard and located in New Guinea) that allows for regular trips to space.

"Rendezvous with Rama" presents readers with the concept of an O'Neill Cylinder traveling between star systems and presents a detailed concept of extraterrestrials. But his most well-known work is "2001: A Space Odyssey," the novel released concurrently with the film in 1968.

The film itself was based on two of Clarke's short stories, "Encounter in the Dawn" (1953) and "The Sentinel" (1948), which were adapted to create the first two parts of the film ("The Dawn of Man" and "Mission to the Moon"). These short stories explore the ideas of first contact between ancient humans and extraterrestrials (paleocontact) and the discovery of an alien artifact on the moon.

This became the basis for the monolith in the film, which is responsible for influencing the evolution of early hominids. These ideas inspired more recent films like "Prometheus," "Arrivals," and others that explore paleocontact and first contact.

As Boissier explained, these novels and films inspired many to get into astronomy, astrophysics, and STEM. "In a recent [study](#), it was shown

that 93% of British professional astronomers have an interest in science fiction, and 69% consider that science fiction influenced their career or life choice.

"I presented a similar study made for French astronomers, performed during and just after the 2024 meeting of the French Society of Astronomy and Astrophysics ([Journées 2024 de la SF2A](#))."

But, of course, the relationship between SF and popular media is hardly one-way. After the 2024 SF2A meeting, Boissier met with his colleague, astronomer Frank Selsis, who shared a few examples of how science fiction inspired scientific research.

"Selsis told me after the meeting that author Laurence Suhner wrote a short story about an [exoplanet around] TRAPPIST-1 at the same time of its discovery, the observations being announced in the journal *Nature* at the time."

Selsis, the research director of the Exoplanets, CLimates, and Planetary Systems Evolution (ECLIPSE) lab at the University of Bordeaux, was part of the consortium that revealed the presence of a potentially habitable exoplanet around Proxima Centauri (Proxima b) in August 2016.

As he related to Boissier, he was also a co-author of a study inspired by a conversation with Luvan, a French SF author known for her novel *Agrapha*. During a presentation last year at the Teich Bird Sanctuary, Selsis spoke on the subject of the relationship between science fiction and exoplanet research (see video above).

Advising SF Writers

As noted, Boissier addresses how science fiction materials can be used as

a pedagogical resource. Contrary to what many believe, there are many popular science fiction franchises where professional scientists advised the writers and visual effects departments.

"Maybe one of the most famous examples is the imagery of the black hole and its accretion disk [in *Interstellar*], for which actual computations were performed," said Boissier. "Kip Thorne was the advisor for the movie. You will find many discussions about it, including a book by Thorne himself."

Kip Thorne's computational models (and *Interstellar*'s visuals) were confirmed in 2019 when the Event Horizon Telescope (EHT) collaboration released the first image of a supermassive black hole and its accretion disk.

In 2021, the EHT released the first image of the SMBHs at the center of the Centaurus A galaxy and the radio jet emanating from it. In 2022, they revealed the first image of Sagittarius A*, the SMBH at the heart of the Milky Way galaxy.

Another example that Boissier enjoys citing is the TV series "*Futurama*," where astronomer David Schiminovich of Columbia University helped advise one of the show's creators.

According to Boissier, this included the 2009 video *Into the Wild Green Yonder*, which featured a "violet dwarf star." This was a clear reference to the work Schiminovich did with NASA's Galaxy Evolution Explorer (GALEX) mission, which observed the universe between 2003 and 2013 in the ultraviolet wavelength.

Also, fans of the series will recall episodes that featured noted scientists like Stephen Hawking, Bill Nye, and noted environmentalist Al Gore. It has also explored concepts ranging from Schrodinger'S cat, general

relativity, Lorentz invariance, the "gray goo" scenario, and simulation theory.

Educating with SF

In addition to recognizing how SF has inspired real-life scientists (and vice versa), Boissier also explores how SF can be used as a pedagogical resource. One of the greatest virtues, says Boissier, is the way SF can make real science accessible to people who might otherwise be intimidated to learn about it:

"I think some people are not confident enough to think they can follow an astronomy lecture or conference, [whereas] they have no problem going to the theatre to watch a science fiction movie. If an astronomer is there to say a few words about science after the movie, we can meet with an audience that we would not find in other places. So, to me, it is important to reach more people."

"I have seen a presentation by Roland Lehoucq in France that was giving shining examples indeed. For instance, using the Star Wars scene in which lightning flashes from the Emperor's fingers, he showed it is possible to compute the potential difference needed for this effect and how thick the soles of his shoes need to be to avoid electrocution. And he computed how much energy is needed for lightsabers to cut through a metal door (it's a lot). Many books explore these types of things, usually starting with "The Science of TITLE HERE."

Examples include Kip Thorne's "The Science of Interstellar," Kevin R. Grazier's "The Science of Dune," and Lawrence M. Krauss and Stephen Hawking's "The Physics of Star Trek."

Moreover, using SF to educate people about science is also a way of combating misinformation, which is especially important in the "age of

the internet," where fringe theories have become more mainstream. One need look no further than social media platforms to find examples, such as "flat earth" theory, creationism, and conspiracy theories involving vaccinations, election outcomes, and assorted ideas that exploit ignorance and fear.

To Boissier, this makes educating people about science, astronomy, and the STEMs (and in a way that is accessible) more important than ever. "To me, it is important because too many people are disconnected from science," he said.

"There is a lot of fake news and misinformation, including subjects on which science can help citizens understand the world. Those are opportunities to bring a little bit of science, to talk about the scientific methods that everybody should know about."

For more information on how SF has inspired science and scientists, check out this list from the [Astronomy and Astrophysics Group at the University of Warwick](#).

More information: Samuel Boissier, On the links between Astronomy, Astronomers, and Science Fiction, *arXiv* (2024). [DOI: 10.48550/arxiv.2408.03183](#)

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