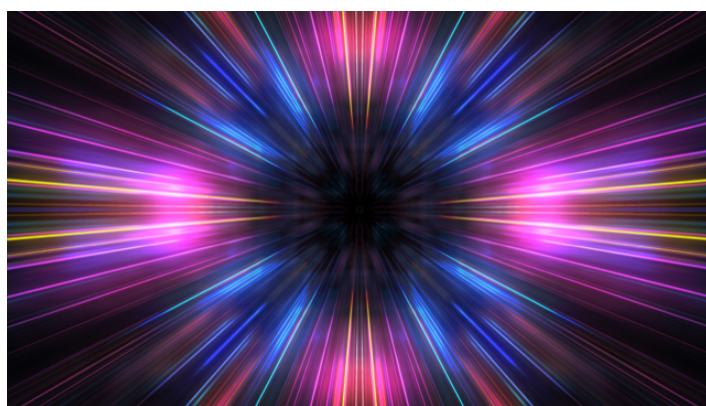


When Sci-Fi Predicts the Future—and When it Doesn't

Breaking the laws of nature isn't the only reason that some science fiction ideas never make it off the written page or out of a movie set.

By Katherine Wright

By day, Charles Adler studies the propagation of laser beams through turbulent media, such as ocean water, and predicts the rainbow patterns formed when light shines through morning dew. By night, the physicist, who works at St. Mary's College of Maryland, explores the world of science fiction, immersing himself in books and films about the voyages of humans through space or the adventures of aliens on distant planets. Adler's two passions do occasionally collide: he published [a book](#) on the physical plausibility of science fiction inventions, and he recently produced [a lecture series](#) on how research shapes science fiction. In a talk last month hosted by



Warp-speed travel through space is likely impossible because of the laws of physics.

Credit: Quardia Inc/stock.adobe.com

the [APS Mid-Atlantic Senior Physicists Group](#), Adler discussed the reasons why some science fiction inventions fail to become reality, even when they are physically plausible.

Science fiction writers have had many successes at predicting future technologies. The novelist Jules Verne, for example, foresaw—in his 1865 book *From the Earth to the Moon*—humans traveling to and landing on the Moon in a device that strongly resembled the early Apollo spacecraft. He also anticipated hologram technology in 1889, nearly eight decades before the first holographic device was demonstrated. While these technologies are now part of everyday life, other science fiction ideas, such as the space elevator from Arthur Clarke's 1979 book *The Fountains of Paradise*, have yet to come to fruition. Others, such as the James-Bond-inspired flying car, have been demonstrated but have so far failed to fully take off.



Space elevators were the focal point of Arthur Clarke's 1979 book *The Fountains of Paradise*. While scientifically possible, they are unlikely to become reality because of their huge cost.

Credit: denisgo/stock.adobe.com



Predicted in 1930, self-driving cars have now become a commercial reality, but there is still some hesitancy from the public.

Credit: Mike Mareen/stock.adobe.com

There are myriad reasons why a science fiction idea flops. The most obvious is that it violates physical laws, but other factors also come into play, such as cost, safety concerns, and social norms. “That a technology breaks the laws of science is the least interesting reason why an idea doesn’t work,” Adler said. He is intrigued by cases where science fiction fantasy has failed to become reality despite being scientifically plausible. “If an idea fails at just one hurdle, it will remain unrealized,” he said.

Warp-speed space travel—popularized by the *Star Trek* TV series—crashes at the physically unfeasible hurdle. The space elevator—Adler’s favorite yet-to-be-realized science fiction invention—could obey the laws of nature, but it is likely too costly for any government or company to build. Flying cars, such as James Bond’s 1974 AMC Matador in *The Man with the Golden Gun*, have made it a step further. Working versions of flying-driving vehicles are now on the market, and earlier this

year, the US Federal Aviation Administration **cleared one of them for takeoff**. But current “roadable aircraft” come with hefty price tags of a few hundred thousand dollars, putting them out of reach of most people. A bigger issue is the regulatory one, as transportation rules would need a complete overhaul. Planes landing in residential streets and cars taking off from highways couldn’t happen without that, Adler said.

Adler’s favorite science fiction idea that appears almost ready for the mainstream is the self-driving car. In his 1930 book *Paradise and Iron*, Miles Breuer imagined an island full of cars that could drive themselves. In the last decades, researchers have shown that it’s possible for a computer to safely steer a vehicle, and in years to come, companies will probably be able to offer autonomous cars at a price that is affordable for many people. But, Adler said, the technology is now up against human psychology. “Will people accept the idea of being in a car that’s driving itself? I don’t know.” He noted that what happens next will be interesting to study from a social science perspective.

The talk ended with a discussion period in which attendees discussed their favorite science fiction ideas. Teleportation was a hot topic—one that stretches the envelope of scientific credibility. But even if it were possible, the thought of turning all your subatomic particles into photons scares even a die-hard science fiction fan like Adler. “You’d definitely be dead if you were transformed in that way,” he said.

Katherine Wright is the Deputy Editor of *Physics*.