

Science fiction inspires innovation in real world

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Carrie moves objects with her mind. Wolverine's skin heals instantly. And Darth Vader and Batman use lightsabers and grappling guns.

Only in the movies?

Not anymore. Hold on to your comic books, nerds. Science "fiction" is becoming science "fact."

Today, more than ever, life is imitating art as fictional gadgets and abilities once the exclusive province of superheroes and telekinetic teens are sparking innovation in the real world.

At the Massachusetts Institute of Technology, researchers Dan Novy and Sophia Brueckner teach a class called "Pulp to Prototype," where [science fiction](#) is required reading to get [students](#) thinking about possibilities that seem far-fetched.

At the University of Minnesota, physics professor James Kakalios found success with the freshman course "Everything I Know About Science I Learned From a Comic Book" and went on to write the popular science book "The Physics of Superheroes."

"Both scientific research and science fiction begin with the same two words: 'What if?'" he said. "The very best science fiction takes things that are established and extrapolates from there."

After watching an X-Men movie, students at Stanford University grew fascinated by Wolverine's rapidly healing skin.

"My students are frequently inspired by science fiction," said Zhenan Bao, their chemical engineering professor. "They said, 'We should make this.' I said, 'That's very interesting. No one has done that before.' So we figured out a way."

Using their superpower.

"Our only superpower is our intelligence," Kakalios said. "And we have used that intelligence to become the dominant species on the planet. We need to continue to use and refine it because the forces of evil are always waiting."

So, what things from science fiction actually are real?

Try these.

Mind control

You can't really move things with your mind like the tortured teen who unleashes telekinetic terror in the "Carrie" remake, which opened Friday.

Can you?

Well, not to that level. But biomedical engineering professor Bin He, Kakalios' colleague at the University of Minnesota, has shown that you absolutely can use your mind to control things. He and his students have developed a "three-dimensional brain-computer interface" that allows users to maneuver a remote-controlled "quadcopter" with their thoughts.

The system uses an electroencephalogram skull cap with 64 sensors. When a user imagines a movement, such as making a fist, neurons in the brain's motor cortex produce electric currents, which are detected by the sensors and sent as a signal to a computer. The computer then transforms those signals into a command and beams it to the copter via Wi-Fi. In tests, subjects have guided the copter through an obstacle course of rings using nothing but their minds.

The goal is to help people with [prosthetic limbs](#) control them more accurately and intuitively. Before, such "mind control" required the implantation of a computer chip, which is expensive and - for some - frightening. The research is even more important in light of the increased need for prosthetic limbs for soldiers injured by roadside bombs in the Middle East.

No, it's not the supernatural mind control we see with Carrie or various X-Men.

But it's a start - one that Kakalios says comes straight from [comic books](#).

"When Iron Man set off his pulsar rays or jet boots, he doesn't press a button or give a voice command," he said. "He just thinks it. Iron Man's suit contains a cybernetic helmet. If you'd have asked me as a kid reading Iron Man in the '60s which part of (his suit) would become real, the cybernetic helmet would have been the last thing I'd have said. But now it's here."

The lightsaber

At the Harvard-MIT Center for Ultracold Atoms, physics professors have coaxed photons to bind together to form molecules - a state of matter that, until recently, had been purely theoretical. Harvard's Mikhail Lukin and MIT's Vladan Vuletic described their work last month in the

journal Nature.

"It's not an inapt analogy to compare this to lightsabers," Lukin said. "The physics of what's happening in these molecules is similar to what we see in the movies."

Now don't go all Luke Skywalker on us. This doesn't mean you could buy an actual lightsaber to bring with you to "Star Wars: Episode VII" in 2015. But it does prove that the science behind it is possible - at least in a lab on a subatomic scale.

Captain America's shield

At the University of Delaware, chemical engineering professor Norm Wagner has developed a substance that repels knife attacks and absorbs vibrations.

"It's said to be very close to the fictional material Vibranium, which makes up Captain America's shield," said Kakalios.

Kevlar can stop bullets but not a jab by a knife or ice pick. After adding Wagner's substance - which flows like a gooey liquid but turns hard (like cornstarch and water) when struck by a force - it can.

Batman's grappling gun

At 26 pounds, the Atlas Power Ascender is bulkier than the gun the Caped Crusader carries on his utility belt. But the Power Ascender has one advantage. It's real.

The hand-held machine, made for military and rescue personnel by Atlas Devices of Boston, enables a soldier or firefighter to "reverse rappel" to the top of buildings or cliffs as fast as 10 feet per second.

The Power Ascender, which also can descend, holds up to 600 pounds, making multiple-person rescues possible. It also works underwater, can tow vehicles and remotely help move equipment and casualties.

Advances in material science will help the system become even smaller and lighter.

Eat your heart out, Bruce Wayne.

Rapidly healing skin

Using a thin plastic containing tiny metal particles, Stanford chemical engineering students created a stretchable synthetic skin that conducts electricity, can sense touch like human skin and heals itself.

No, you can't use it to instantly heal wounds like a mutant. But the revolutionary skin could be used in high-tech bandages to help monitor a patient's health. It also could be used in products such as smart watches, where electronics have to conform to a curved surface.

"If you get a crack in it, or if it gets cut in half, it can heal itself," Bao said. "It's engineered with both strong and weak chemical bonds. This gives the molecules its self-healing properties."

Warp drive

When speed is what it needs, Star Trek's Starship Enterprise goes into warp drive, zooming faster than light.

Cool, but impossible, right?

Believe it or not - and plenty of his contemporaries don't - Harold "Sonny" White, a physicist with NASA's Johnson Space Center, thinks it is possible to build a warp drive that wouldn't violate the laws of physics.

Based on a warp drive proposed by Mexican physicist Miguel Alcubierre, White's design involves a football-shaped spaceship encircled by a large ring.

White, who has said signed agreements limit how much he can say, discussed his idea with Clara Moskowitz, assistant managing editor of Space.com:

"This ring, potentially made of exotic matter, would cause space-time to warp around the starship, creating a region of contracted space in front of it and expanded space behind," Moskowitz wrote. "Meanwhile, the starship itself would stay inside a bubble of flat space-time that wasn't being warped at all."

Think of it as an interstellar loophole. While nothing can travel faster than light, space-time (called the fabric of space) is not subject to such a cosmic speed limit. By "warping" space-time, White believes, a ship effectively could travel at 10 times the speed of light.

"There is hope," White told an audience last year. He now is experimenting with a mini version of the [warp drive](#) in his lab.

Doubters say no way.

Who's right?

We'll leave you with this exchange between Star Trek's Capt. Jean-Luc Picard and Lt. Cmdr. Data.

Picard: "Data, find a way to defeat that shield."

Data: "That may be impossible, sir."

Picard: "Things are only impossible until they're not!"

On the streets

What things from science fiction would you like to become science fact?
We hit the streets and asked folks what they thought.

"I guess a lightsaber would be cool," said Scott King, an Olathe business consultant. "I could hack up some wood, or - I don't know - cut my grass with it? It's not very practical. I'd much rather have my own transporter. No more traffic. Just wink at my wife and say, 'Energize.' Then, five seconds later, you know, I'm sitting in my office. Oh! I know! I want that magic microwave thingy on Star Trek (the food replicator) where you tell it what you want and it makes it for you. I'd be all like, 'Ribs! Bacon! Hot fudge sundae!'"

Marissa McDonald of Gladstone wants a "Holodeck" in her home. (On "Star Trek, the Next Generation," the Holodeck was a computer-controlled simulated reality room where anything could be replicated with holographic images that a user could interact with as if they were real.)

"I want that so bad, you don't even know," she said. "It's really making me angry that it doesn't exist."

And, finally, there's this from Julie Evans of Overland Park, Kan.

"There's just one thing I've wanted since I was little," she said. "I want to fly. I want to soar with the birds. I want to go to Paris in, like, seconds. I guess the other stuff is neat. But for me, this is the coolest. Are you listening, scientists. I want to fly!"

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