Making sense of Iron Man's science

April 26 2016, by Chris Marr, Sciencenetwork Wa

UWA Professor Adrian Keating suggests some of the technology seen in the latest Marvel blockbuster, such as controlling the exoskeleton with simple thoughts, will be available in the near future. Credit: Marvel Studios

With this week's release of the new Captain America movie, Civil War, it's another opportunity to see Captain Rogers and Tony Stark as Iron Man draw on their superhuman strength and technology—even if they bring it to bear against each other this time around.

But how much of our favourite superheros' power lies in science and how much is complete fiction?

As Iron Man's name suggests, he wears a suit of "iron" which gives him his abilities—superhuman strength, flight and an arsenal of weapons—and protects him from harm.

In scientific parlance, the Iron man suit is an exoskeleton which is worn outside the body to enhance it.

In the 1960s, the first real powered exoskeleton appeared—a machine integrated with the human frame and movements which provided the wearer with 25 times his natural lifting capacity.

The major drawback then was that the unit itself weighed in at 680kg.

UWA Professor Adrian Keating suggests that some of the technology seen in the latest Marvel blockbuster, such as controlling the exoskeleton with simple thoughts, will be available in the near future by leveraging ongoing advances of multi-disciplinary research teams.

"Dust grain-sized micromachines could be programmed to cooperate to form reconfigurable materials such as the retractable face mask, for example," Prof Keating says.

However, all of these devices are in need of a power unit small enough to be carried yet providing enough capacity for more than a few minutes of superhuman use, he says.

Does anyone have a spare Arc Reactor?

Currently, most exoskeleton development has been for medical applications, with devices designed to give mobility to amputees and

paraplegics, and there are a number in commercial production and use.

Dr Lei Cui, who lectures in Mechatronics at Curtin University, has recently developed both a hand and leg exoskeleton, designed for use by patients who have undergone surgery or have nerve dysfunction, spinal injuries or muscular dysfunction.

"Currently we use an internal battery that lasts about two hours in the glove, which can be programmed for only four different movement patterns," Dr Cui says.

Dr Cui's exoskeletons are made from plastic, making them light but offering little protection compared to the titanium exterior of Stark's favourite suit.

It's clear that we are a long way from being able to produce a working Iron Man suit at all, let alone one that flies, protects the wearer and has the capacity to fight back.

This article first appeared on ScienceNetwork Western Australia *a science news website based at Scitech.*

Provided by Science Network WA