Film Review

Leaving the world instead of saving it

Interstellar. Directed by Christopher Nolan

Reviewed by Peter Dickens

Science fiction has often used the cosmos to mirror earthly hopes and fears, a well-known example being Kim Stanley Robinson's *Mars Trilogy*. (1993, 1994, 1996) In those novels competition for resources and mounting ecological crises have led to permanent war on Earth while transnational corporations ('the transnats') are in full control throughout the Earth and Mars. A pioneering group starts 'terraforming' the red planet, using genetic engineering to create algae, lichen and bacteria to make it habitable by humans and other creatures. But such scientific advances lead to many contests and struggles. Unsurprisingly, given its close resonance with today's society, *The Mars Trilogy* has yet to make it to the silver screen, but it made an important point about science fiction. Science can be used to understand the universe but its uses cannot afford to ignore power relations and social contest.

Interstellar has been one of the highest-grossing films in recent movie history. It too depends on scientific advances and speculations to make its case. But, unlike the *Mars Trilogy*, it contains little or no reference to the relationships between science and power. And, as confirmed in an accompanying book written by Kip Thorne, a renowned professor of theoretical physics, its contents are entirely asocial and apolitical. (Thorne 2014)

Climate change is central to the movie. Earth and its inhabitants are stewing. The film opens in high drama; satellite-guided tractors in the USA's Midwest are encountering violent and continuous dust storms and their GPS guidance systems are failing. Crops are failing on a mass scale while Earth's nitrogen levels are increasing and its oxygen levels are in rapid decline. Meanwhile society is regressing into a failed pre-industrial era. Help is at hand via a mysterious binary message sent to a former NASA pilot and struggling farmer called Cooper (Matthew McConaughey).

The message leads Cooper and his daughter to a secret NASA outpost where he finds Dr Brand (Michael Caine) developing plans to save the world. Now operating on a financially smaller scale, NASA is finding ways of saving the Earth from social and climatic catastrophe. These plans are termed 'the Lazarus solution.' Pioneer astronauts

have been ‘sent out to search for new homes for humanity’. (Thorne 2014:115) ‘Plan A’ is Brand’s preferred solution, one in which quantum gravity would be harnessed to propel space stations into the cosmos. In this way the world’s population would be evacuated. ‘Plan B’ is a fallback in case the professor cannot solve Plan A’s complex physics. It entails transporting five thousand genetically-diverse human embryos to space stations on habitable worlds in another universe. Such diversity would make humanity resistant to health threats in the cosmos. Central to the plan is Gargantua, a giant wormhole roughly 10 billion light years from Earth, created by an unknown alien intelligence and spinning close to the speed of light. The hole is a tear in the space-time continuum, converting space into time and offering access to other galaxies and planets. Ten years earlier a small group of astronauts had used the hole to explore the potential of these planets for human habitation. They had sent back promising reports but had not returned home. The hole is the means by which the former NASA pilot Cooper and his NASA colleague Dr Brand’s daughter (played by Anne Hathaway) will again access these potentially habitable worlds and save humanity. Brand has used Plan A to fool his chosen astronaut Cooper into leaving Earth and undergoing his mission. Yet, Cooper insists, ‘it is something I was born to do’

The movie is spectacular. Penetration of the wormhole by Cooper, Brand and two other astronauts is its most memorable and most defining feature. The main creative drive for the film came from the director, Christopher Nolan, but scientific respectability is brought in by Kip Thorne and the film’s ‘visual effects team’. (Thorne 2014). And, as Thorne and others describe in two equation-filled academic papers, the wormhole is depicted in a way which, they say, is compatible with known physical laws. (James et al 2015a, b) Thorne argues that ‘nothing in the film…violates the firmly established physical laws’ and the science informing the movie is said by Thorne to be ‘at or just beyond today’s frontiers of human understanding’. (2014:x) But the film’s director, Christopher Nolan, freely admits that this ‘firm science’ was somewhat modified to maintain the story’s interest and the plotline. (Rogers 2014) Thorne has later suggested that the visualizations he helped inspire have even influenced developments within in science itself, sparking off fresh speculations and possibly new discoveries. Furthermore, the editor of the *American Journal of Physics* has argued that the film should now be used in school classes ‘to get across ideas about general relativity’. (Ghosh 2015)

As the *Red Mars* trilogy showed, there is no necessary problem with using science to enable people to imagine new kinds of society. But two important extra issues are raised by *Interstellar*. The first is the definition of ‘science’. Physics has been made central here but if the life sciences had also been incorporated, it would have placed a massive (though perhaps pedantic?) query over Brand’s assertion that ‘we’re not meant to save the world’,

'we're meant to leave it'. Our bodies, if not our minds, seem definitely not 'meant to leave it'. Current research suggests, for example, that astronauts suffer major damage to bone and muscle, especially as they start travelling long distances. (Clement 2011, Phillips 2012) Furthermore, radiation from the Sun and other parts of the Solar System is likely to damage human cells and increase the incidence of cancer. As a result, astronaut Cooper and his colleagues could well arrive very sick and unable to walk on the habitable planets. Human decrepitude of this kind might be useful to a horror movie but it would not have made for a good escapist movie experience.

But the absence of the life sciences is not the most difficult part of this movie. The problem is its wholly optimistic vision of science's redemptive powers. As Thorne puts it:

> More than anything, I'm moved by Interstellar's underlying, optimistic message. We live in a universe governed by physical laws. By laws that we humans are capable of discovering, deciphering, mastering, and using to control our own fate…. We humans are capable of dealing with most any catastrophe the universe may throw at us, and even those catastrophes we throw at ourselves – from climate change to biological and nuclear catastrophes. (2014: 275)

What will stop the newly-humanised planets being wrecked in turn by rapacious 'transnats'? Ms Hanley, a teacher of Cooper's daughter, is partly right when she argues early in the movie that 'if we don't want to repeat the excess and wastefulness of the 20th century then we need teach our kids about the planet, not tales of leaving it'. But she might have added that the 20th century also showed that science can bring unanticipated and dangerous consequences. The lessons of Red Mars need remembering here. Science cannot depend on the insights and goodwill of the real scientist Thorne or the fictional Dr Brand. Rather, the making of science should be subject to democratic debate, and its application should be subject to popular control.

Clement, G. (2011) *Fundamentals of Space Medicine*. New York, Springer. (2nd edn.)

Ghosh, P. (2015) 'Interstellar "should be shown in school lessons"'. http://www.bbc.co.uk/news/science-environment-33173197. (Accessed 30.6.15)

James, A., von Tunzelmann, E., Franklin, P, Thorne, K. (2015a) 'Gravitational lensing by spinning black holes in astrophysics, and in the movie Interstellar. *Classical and Quantum Gravity*, 32,6. (Open Access http://iopscience.iop.org/0264-9381/32/6/065001/article)

James, O., von Tunzelmann, E., Franklin, P., Thorne, K. (2015b).'Visualising Interstellar' Wormhole. *American Journal of Physics* 83.486. (Open Access: http://scitation.aip.org/content/aapt/journal/ajp/83/6?ver=pdcov)

Phillips, R. (2012) *Grappling with Gravity. How Will Life Adapt to Living in Space?* New York, Springer.

Rogers, A. (2014) 'Christopher Nolan and Kip Thorne give *Wired* an extensive look at the creation of Interstellar's Black Hole. *Wired* http://www.wired.com/2014/10/astrophysics-interstellar-black-hole. (Accessed 30.6.15)

Thorne, K. (2014) *The Science of Interstellar*. New York, Norton.