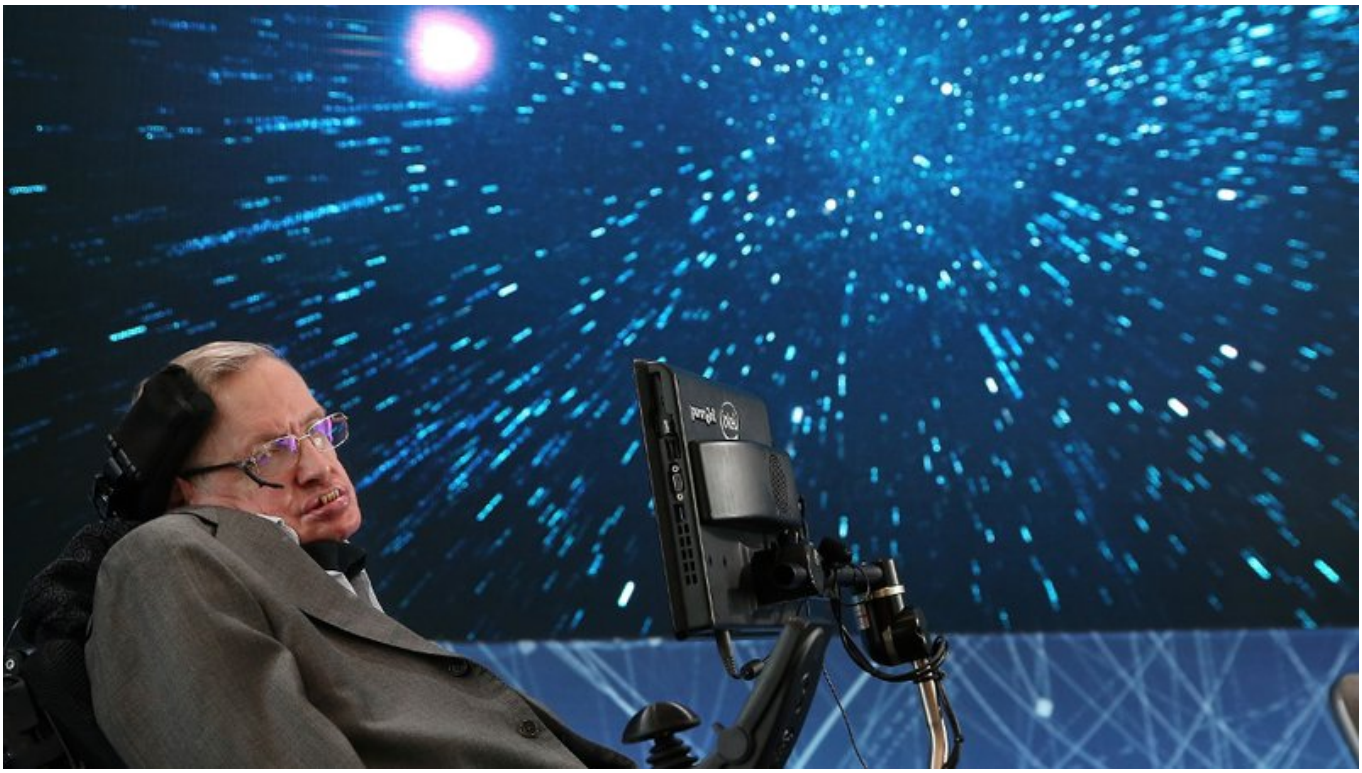
Stephen Hawking: "a successful scientist never truly dies"

Updated / Wednesday, 13 Mar 2019 **13:01**



"Hawking devoted a great deal of time to science outreach, unusual for a scientist at this level"

Opinion: a year on from the death of the theoretical physicist and cosmologist, it's clear that Hawking's science will continue to have an impact on the world

By Cormac O'Raifeartaigh, Waterford Institute of Technology

Tomorrow (March 14th) marks the first anniversary of the death of Stephen Hawking, the brilliant Cambridge theoretical physicist and cosmologist who became an icon of science. Diagnosed with a life-threatening disease in his early twenties, Hawking went on to become the world's most famous physicist since Einstein. Although his irreverent presence is greatly missed by scientists and the public alike around the world, his investigations of the workings of the universe will endure for centuries.

Why was he so famous?

One reason may be his field of study. He was known for his work in cosmology, the study of the universe. In particular, his work on black holes and on the big bang model of the universe is greatly admired. There is a certain public fascination with abstract

scientific concepts such as the origin of the universe and the nature of space and time (it's hardly a coincidence that much of Einstein's work was in this field).

05:39

From RTÉ Radio 1's Morning Ireland, Will Goodbody discusses the life and death of Professor Stephen Hawking

Another reason may be Hawking's disability. He was diagnosed with motor neuron disease (ALS) in his early 20s and given two years to live. The story of a brilliant mind trapped in a crippled body has universal appeal and the wheelchair-bound figure communicating deep ideas by voice synthesizer became an icon of science.

In the 1980s, Hawking published A Brief History of Time, a book on the big bang aimed at the general public. It quickly became an unprecedented science bestseller and made him a household name. From then on, he devoted a great deal of time to science outreach, unusual for a scientist at this level.

The background

Hawking was born in London in 1942, the son of two academics, and studied physics at Oxford. He wasn't outstanding as an undergraduate, but did well enough to be accepted for postgraduate research in Cambridge. There, he became interested in cosmology, in particular in the battle being waged at Cambridge between the "big bang" and "eternal universe" theories. He showed early promise as a postgraduate when he demonstrated that Fred Hoyle, a famous cosmologist and prominent exponent of the eternal universe, had made a mathematical error in his work.

29:17

From RTÉ Radio 1's Ray D'Arcy Show, Stephen Hawking's daughter Lucy on her father's last book Brief Answers to the Big Questions

What about Hawking's own science?

His work focused mainly on phenomena such as black holes and the big bang. Such phenomena are described by Einstein's general theory of relativity, which predicts that space and time are not fixed but affected by gravity. In the case of black holes, relativity predicts that space is so distorted by gravity that energy, even light, cannot escape. In the case of the universe at large, relativity predicts that our universe started in a tiny, extremely hot state and has been expanding and cooling ever since; the so-called big bang model.

However, general relativity does not work well on very small scales and this is the realm of quantum physics. Hawking's lifelong work concerned the attempt to combine general relativity (used to describe space and time) with quantum physics (used to describe the world of the very small) to describe objects such has black holes. His prediction that black holes should emit radiation ("black holes ain't so black") is the most famous result of this work. Although the prediction has not yet been verified experimentally, it is considered a very important result in modern physics.

My favourite Hawking contribution is the no-boundary universe. Working with James Hartle, he used a combination of relativity and quantum physics to predict that our universe may not have had a definite point of beginning because time itself may not be well-defined in the intense gravitational field of the infant universe!

04:35

From RTÉ Radio 1's News At One, Dr. Cormac O'Raifeartaigh on Stephen Hawking's legacy as a scientist

Was Hawking another Einstein?

Not quite. Einstein made a great many contributions to diverse areas of physics and relativity fundamentally changed our understanding of space and time, with profound implications for all of science and philosophy. It's hard for any modern scientist to compete with this.

How will Hawking be remembered?

A successful scientist never truly dies if his work is still used, just as Beethoven's compositions are still played today. In Hawking's case, it is likely that we will still be talking about Hawking radiation 100 years from now.

Dr Cormac O'Raifeartaigh lectures in physics at Waterford Institute of Technology, is a Visiting Associate Professor at University College Dublin and is a Fellow of the Institute of Physics

---

The views expressed here are those of the author and do not represent or reflect the views of RTÉ
