Hawking, Stephen William from *Philip's Encyclopedia*

English theoretical physicist. He used the general theory of relativity and quantum mechanics to produce theories on big bang and the formation of black holes. He found the powerful gravitational field around super dense black holes can radiate matter. Hawking wrote the science bestseller *A Brief History of Time* (1988).

Summary Article: *Hawking, Stephen (1942-)*
from *Encyclopedia of Science and Technology Communication*

Some have called Stephen Hawking the most brilliant physicist since Albert Einstein. Hawking has been quick to point out that he was born 300 years to the day after Galileo Galilei died and that he holds the same professorship at Cambridge University Isaac Newton once held.

If visible scientists are scientists well-known to the public, then Hawking is not just a visible scientist—he is a rock-star scientist.

Hawking was born on January 8, 1942, in Oxford, England, and spent most of his childhood in St. Albans, a town 20 miles north of London. In 1959, he received an open scholarship to University College, Oxford, where he began studies at the age of 17. In 1962, he received his first-class honors degree from Oxford and then began studying for a PhD in cosmology at Cambridge University, where he pursued his interests in black holes, singularities, and other areas of interest—sometimes thought of as the physics of the very big and the very small.

In 1965, Hawking received his PhD and began a fellowship in theoretical physics at Cambridge’s Gonville and Caius College, where he often collaborated on space-time research with mathematician Roger Penrose. He became a staff member of Cambridge’s Institute of Astronomy in 1968 and worked with Penrose on mathematics and thermodynamics related to black holes. Hawking was named a Fellow of the Royal Society in 1974, then spent a year as the Fairchild Distinguished Scholar at the California Institute of Technology. In 1978, he received the top theoretical physics honor, the Albert Einstein Award of the Lewis and Rose Strauss Memorial Fund.

His work focuses on black holes, particle physics, quantum gravity, and other areas related to the origin of the universe and work toward developing a grand unification theory, or theory of everything, that would link Einstein's theory of relativity with quantum mechanics. By the 1980s, he was working on big bang issues. Was there a big bang, or were there universes that produced other universes? Is there a beginning? Is there an end? If there is a singularity at the end of a star’s collapse, was it possible that there had been a singularity at the beginning of the universe? He and Penrose showed that the answer was yes.

Hawking has received many of the most prominent awards in science, including the Eddington Medal of the Royal Astronomical Society (1975), the Pius XI Gold Medal (1975), the Maxwell Medal of the Institute of Physics (1976), the Franklin Medal of the Franklin Institute (1981), the Gold Medal of the Royal Society (1985), the Paul Dirac Medal and Prize (1987), the Britannica Award (1989), and the Royal Society’s Copley Medal (2006). He has also received honorary degrees from a variety of universities.

Greater fascination has surrounded Hawking's life and the interconnection of his life with the study of such "big picture" scientific questions than for perhaps any other modern scientist. In 1973, Hawking showed that particles are emitted by black holes. Then he formulated the theory that black holes could emit subatomic particles (Hawking radiation). In 2004, Hawking said he was wrong in his previous black hole theory—instead of black holes devouring everything, he said that stuff may be preserved, with mass sent back into the universe.

Hawking has amyotrophic lateral sclerosis, also known as Lou Gehrig's disease. It was first noticed during his time at Oxford and progressed during his time at Cambridge. When he was originally diagnosed, doctors predicted, incorrectly, that he would live for only another 2 1/2 years. The progression of the disease was such, however, that he would eventually require a wheelchair and full-time nursing care. A case of pneumonia in 1985 forced an operation that would also leave him without a voice. Later, a device dubbed "the equalizer" would allow him to communicate through a computer and speech synthesizer attached to his wheelchair.

Hawking cowrote *The Large Scale Structure of Space-Time* (1973) with G. F. R. Ellis. It was a highly technical, mathematical book—very different from what would follow 15 years later. In 1979, the same year he was named Lucasian Professor of Mathematics at Cambridge, he coedited with Werner Israel *General Relativity: An Einstein Centenary Survey*. He published *Three Hundred Years of Gravitation* (Cambridge University Press) in 1987.

In 1988, he published *A Brief History of Time: From the Big Bang to Black Holes*, a book that includes historical coverage, as well as coverage of how his own theories fit into the timeline of our understanding of cosmology, general relativity, and quantum physics. The ideas presented in *A Brief History of Time* may have their own importance in the scientific world, but they are not necessarily the most important elements with respect to the ultimate impact of the book—and Hawking's career as a science communicator.

*A Brief History of Time* became extremely important to the general public as a readable window on the world of physics. It was intended from the beginning for a lay audience and became a best seller, with ripples through magazines, movies, and television. Hawking consciously chose the layman's path for *A Brief History of Time*, choosing trade publisher Bantam over an academic publisher such as Cambridge University Press. The only equation in the book is $e = mc^2$ (following advice from the publisher, who said that equations hurt book sales).


Hawking became a household name who appeared in cameo roles on popular television and whose
Brief History of Time: From the Big Bang to Black Holes continues to attract readers. Today, his contributions as a communicator and his status as a celebrity may even rival his reputation as a scientist.

See also
Visible Scientist

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