

1942–2018

The world suffered an immeasurable loss when Stephen Hawking died March 14, 2018. ANDRÉ PATTENDEN/COURTESY STEPHEN HAWKING



# REMEMBERING Stephen Hawking

Science received a heavy blow this year with the loss of its leading luminary. **by David J. Eicher**

If you felt the world of science collectively shudder this spring, it was because the field lost its most brilliant mind. Stephen William Hawking — theoretical physicist, mathematician, philosopher, author, and genius — died in his home in Cambridge, England, at age 76. In this terrible event, humanity lost perhaps its most brilliant and original thinker. The world is certainly now a darker place.

Born in Oxford in 1942, Hawking was the son of parents who worked in medical research. Schooled in London, he showed interest and aptitude in science and leaned toward a scientific career when he began studying at the University of Oxford. He emerged socially, and developed interests in classical music and science fiction.

Hawking took up graduate studies at the University of Cambridge in 1962. Interested in relativity theory and cosmology, he was initially disappointed that he drew Dennis Sciama as a supervisor rather than the more famous Fred Hoyle. At this time, suddenly, he began to feel alarming symptoms and was diagnosed with motor neuron disease, an increasing paralysis and loss of muscular control similar to Lou Gehrig's disease (or ALS). This put Hawking into a depression; he had to fight through the debilitating symptoms to carry on with any hope of his career. Initially, doctors proclaimed he had perhaps two years left to live.

In June 1964, Hawking began to stand out from his young colleagues, not because of his disease but because of his unusual brilliance. He publicly called out the great Hoyle at a lecture, questioning his ideas. Hoyle was a proponent of the so-called steady state model, which suggested that the cosmos could collapse on itself eventually and then rebound in a series of expansions and contractions. The other leading cosmological idea, the Big Bang, was gaining traction during this time, and Hawking supported it. In this model, the cosmos would expand forever, without a cyclic contraction. Shortly thereafter, in fact, Bell Labs astronomers Arno Penzias and

Robert Wilson discovered the so-called cosmic microwave background radiation, the faint, omnipresent echo of the Big Bang. Hawking's determination for the Big Bang was turning out to be correct.

Hawking, of course, became immensely famous in the years to come through his brilliant studies of astrophysics and cosmology. He finished his Ph.D. in 1966 on the topic of "Properties of Expanding Universes," and it shared top physics honors that year with a paper written by one of his distinguished professors, Roger Penrose.

Along with Penrose and others, Hawking picked up the mantle of Einstein, investigating many cosmological ideas during the early years of his professorship at Cambridge. He eventually took on the title of Lucasian Professor of Mathematics at the venerable institution, occupying the same chair once held by Isaac Newton centuries earlier.

Most of Hawking's work during the late 1960s and 1970s focused on black holes, and this led to his great friendship and collaboration with Caltech's Kip Thorne. Aside from deciphering the physics of black holes, Hawking postulated what came to be known as Hawking radiation — that black holes, in some cases, could leak radiation over long time intervals, and possibly evaporate. His immense grasp of mathematics, despite increasing illness and inability to easily communicate, stunned the science world.

The theoretical physics of black holes was one thing; finding them was another. Postulated in the 18th century, these regions of intense gravity were very hard to identify. In the early 1970s, the best candidate was Cygnus X-1. Hawking made a bet with Thorne. If Cyg X-1 turned out to be a black hole, Stephen would owe Kip a magazine subscription. If the opposite were true, Kip would owe Stephen. By 1990, the verdict was in, and Cygnus X-1 was determined to be the

first confirmed stellar black hole. Hawking had requested a subscription to *Popular Mechanics*; Thorne had wagered a subscription to *Penthouse*. Stephen anted up and sent the magazines to Pasadena.

Hawking's research rocketed onward in many areas, focusing on cosmology and theoretical astrophysics. He established his reputation of being the smartest guy around by extending and confirming many of Einstein's ideas. And all of this was accentuated by his terrible disease, which progressively pushed him into being aided ever more by sophisticated wheelchairs, supplemented by speech therapy computers that would allow him to produce sentences with eye and mouth movements, and to program and deliver

spectacular talks that would amaze his colleagues and fascinate the public.

I was fortunate enough to meet Stephen as a fellow member of the Starmus Festival Board of Directors. A good friend of the festival's founder and director, Garik Israelian, Stephen

was a profound supporter of this celebration of science and music. He really loved music and was extremely funny, as anyone who saw one of his talks knows.

Stephen taught me to never be afraid again. After I delivered an hourlong talk on astrophysics with Stephen and his nurses in the front row, I thought, my goodness, that's it. The fact that he liked it and was such a kind person, so concerned about Earth and all its creatures, made the recent news harder to hear.

I was in Costa Rica staring at the sky when someone ran by and shouted out the terrible news. The world will never be the same. But now Stephen is with the stars he loved. ♡

**David J. Eicher** is Editor of *Astronomy* and a member of the Starmus Festival Board of Directors, which also included Stephen Hawking.

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