

**Stephen Hawking, PhD**

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**Visionary Scientist, Dedicated Professor, Acclaimed Researcher, and Best-Selling Author**

Renowned for international record of achievement in theorising and publishing pioneering work in physics and cosmology. Deeply curious thought leader committed to expanding accessibility of science and scientific concepts of the universe and space-time from the strict scientific domain to reach and engage the general public and individuals of all ages.

Controversial and collaborative approach to generating knowledge through debates on the origin of the universe, the existence of God, and numerous laws of science, gravity, time, and space. Served as the Emeritus Lucasian Professor for Cambridge, a title held also by Isaac Newton, Paul Dirac, and Charles Babbage.

**SELECT ACHIEVEMENTS**

- Internationally recognised for numerous publications including: *A Brief History of Time*, *The Grand Design*, *The Universe in a Nutshell*, *A Briefer History of Time*, and *The Grand Design*.
- Recognised as an archetypical scientist and appeared on popular TV shows including *The Simpsons* and *The Big Bang Theory*; life-story was presented in the feature film *The Theory of Everything*.
- Awarded the Copley Medal from the Royal Society (2006), the Presidential Medal of Freedom from the US (2009), the Russian Special Fundamental Physics Prize (2013).
- Received the Albert Einstein Medal and an honorary doctorate from the University of Oxford (1978).
- Presented with the Eddington Medal and the Pius XI Gold Medal (1975), the Dannie Heineman Prize, the Maxwell Prize, and the Hughes Medal (1976).
- Awarded the American Franklin Medal (1981) and was appointed the Commander of the Order of the British Empire in the 1982 New Year Honours. Voted for inclusion on the BBC's list of the 100 Greatest Britons.
- Received numerous honorary degrees: the Gold Medal of the Royal Astronomical Society (1985), the Paul Dirac Medal (1987), and the prestigious Wolf Prize (1988, with Penrose).
- Fellow of the Royal Society and a member of the US National Academy of Sciences and the Pontifical Academy of Sciences.
- Dubbed the "Master of the Universe" by Newsweek magazine for ground-breaking contributions to science while simultaneously overcoming challenges to an early-life diagnosis of ALS.
- Partnered with daughter, Lucy Hawking, to write and publish a children's book on science: *George and the Unbreakable Code*.

**EDUCATION**

**PhD, Applied Mathematics and Theoretical Physics, March 1966** (*Specialty in general relativity and cosmology*)  
 Cambridge University, Cambridge, England

- *Doctoral Thesis: "Properties of Expanding Universes", 1966*

**BA (Hons.) degree in Natural Science, 1962**  
 Oxford University, Oxford, England

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**EXPERIENCE HIGHLIGHTS**

**University of Cambridge, Cambridge, England**

2009 to 2018

**Director, Department of Applied Mathematics and Theoretical Physics**

Following tenure as the Lucasian Professor of Mathematics, selected as Director of the Dennis Stanton Avery and Sally Tsui Wong-Avery Director of Research. Led department renowned for engaging in world-class research in diverse subject areas within applied mathematics and theoretical physics.

*Notable Accomplishments:*

- Served as the Founder of the Centre for Theoretical Cosmology (CTC) at the University and led the General Relativity group in DAMTP.
- Continued to serve as Principal Investigator of the COSMOS National Cosmology Supercomputer.
- Contributed to launching Breakthrough Initiatives, an effort to search for extra-terrestrial life, including the *Stephen Hawking: Expedition New Earth*, a documentary on space colonisation, as a 2017 episode of *Tomorrow's World*.
- Completed research to alter original theory on black holes; proposed that not all information was necessarily lost, and some might be retrievable when a black hole collapsed.
- Held a party (with none in attendance) that was publicised only after it ended, as an ironic test of the conjecture that travel into the past is effectively impossible.

**University of Cambridge, Cambridge, England**

1977 to 2009

**Lucasian Professor of Mathematics (1977 to 2009)**

**Professor of Gravitational Physics (1977 to 1979)**

Initially advanced to Professor of Gravitational Physics then assumed long-term standing as the Lucasian Professor of Mathematics. Developed numerous theories and engaged in debates and investigations with colleagues while fostering an evolving intuitive and speculative approach to research, as opposed to relying on strict mathematical proofs for exploring and presenting theories.

*Notable Accomplishments:*

- Delivered an inaugural lecture (as Lucasian Professor of Mathematics): "Is the End in Sight for Theoretical Physics?" with the proposal of N=8 Supergravity as the leading theory to address many outstanding problems studied by physicists
- Pursued continuous research to develop the Hawking Radiation Theory and delivered a series of lectures with Penrose on "The Nature of Space and Time" while working with colleagues on general relativity and quantum mechanics concepts with various modifications to black hole theories.
- In 1981, presented a proposal leading to the "Black Hole War" with Leonard Susskind and Gerard 't Hooft; proposed an information paradox that violates a fundamental tenet of quantum mechanics.
- Contributed to Cosmological Inflation theory, proposing that following the Big Bang, the universe expanded rapidly then settled to a slower expansion; delivered the "The Very Early Universe" Nuffield Workshop and proposed quantum fluctuations similar to the famous Hawking radiation theory.
- Developed and presented concepts and theories to attempt to link the quantum theory of the microworld and Einstein's theory of gravity and space-time.
- Engaged in quantum theory research to explore the origins of the universe; presented work suggesting the possibility of an absence of a space-time boundary to the universe; later published the model Hartle-Hawking state with Jim Hartle, with implications about the existence of God.

*continued.*

- Completed theoretical work to result in the Arrows of Time theory and a 1985 publication theorising that when the universe stopped expanding and collapsed, then time would run backward, but then redacted theory following calculations by colleagues Don Page and Raymond Laflamme.

#### California Institute of Technology, Pasadena, CA

1970 to 1977

##### *Sherman Fairchild Distinguished Visiting Professor*

Received appointment to world-renowned US research and technology institute to collaborate with colleagues to study the properties, existence, and nature of black holes. Completed rigorous research, delivered lectures, and fostered strong networks with leading scientists.

##### *Notable Accomplishments:*

- During this time, engaged in a now famous wager on the proposition that black holes did not exist, specifically whether the X-ray source Cygnus X-1 was a black hole.

#### University of Cambridge, Cambridge, England

1962 to 1975

##### *Research Fellow, Research Assistant, Reader, & Doctoral Student*

Under supervision of Dr. Dennis Sciama, engaged in inaugural research in cosmology to complete PhD in 1965 then transitioned among Cambridge colleges to envision, plan, complete, and publish foundational theories and discoveries in mathematics and theoretical physics. Transitioned between the Department of Applied Mathematics and Theoretical Physics, Gonville & Caius College, and the Institute of Astronomy.

##### *Notable Accomplishments:*

- Upon completing Doctoral Thesis, *Properties of Expanding Universes*, assumed role as a Research Fellow then served as Fellow for Distinction in Science (1969) at Gonville & Caius College within Cambridge.
- Won the Adams Prize for essay *Singularities and the Geometry of Space-time*, and subsequently transitioned to the Institute of Astronomy in 1968.
- Returned to Department of Applied Mathematics and Theoretical Physics (1973) as Research Assistant to collaborate with George Ellis to write and publish, *The Large Scale Structure of Space-Time*.
- In 1975, became Reader in Gravitational Physics at Department of Applied Mathematics and Theoretical Physics.
- Accepted the Fellowship for Distinction in Science, a specially created role to remain at Caius College.

### PUBLICATIONS

- A Smooth Exit from Eternal Inflation. S.W. Hawking, T. Hertog. 24 Jul 2017. 14pp, arXiv:1707.07702 [hep-th]
- The Conformal BMS Group. S.J. Haco, S.W. Hawking, M.J. Perry, J.L. Bourjaily. 27 Jan 2017. 16pp, arXiv:1701.08110 [hep-th]
- Superrotation Charge and Supertranslation Hair on Black Holes. S.W. Hawking, M.J. Perry, A. Strominger. High Energ. Phys. (2017) 2017: 161. DOI: 10.1007/JHEP05(2017)161.
- Black Holes: The Reith Lectures. S.W. Hawking, May 2016, ISBN-13: 978-0857503572
- George and the Blue Moon. L. Hawking, S.W. Hawking, Mar 2016, ISBN-13: 978-0857533272
- Soft Hair on Black Holes. S.W. Hawking, M.J. Perry, A. Strominger. Jan 5, 2016. 9pp. Published in Phys. Rev. Lett. 116 (2016) no.23, 231301, arXiv:1601.00921, DOI: 10.1103/PhysRevLett.116.231301
- The Information Paradox for Black Holes, S.W. Hawking. Sep 3, 2015. 3 pp. DAMTP-2015-49 e-Print: arXiv:1509.01147 [hep-th]
- George and the Unbreakable Code. L. Hawking. S.W. Hawking. Jun 2014. ISBN-13: 978-0857533258
- Information Preservation and Weather Forecasting for Black Holes. S.W. Hawking. Jan 2014. arXiv:1401.5761v1 [hep-th]

- My Brief History. S.W. Hawking, Sep 2013. 144 pp ISBN-13: 978-0345535283
- Vector Fields in Holographic Cosmology. James B. Hartle. S.W. Hawking, Thomas Hertog. May 2013. 17 pp. arXiv:1305.7190v1 [hep-th], DOI: 10.1007/JHEP11(2013)201
- George and the Big Bang. L. Hawking. S.W. Hawking. Aug 2012. ISBN-13: 978-1442440050
- Quantum Probabilities for Inflation from Holography. James B. Hartle. S.W. Hawking, Thomas Hertog. Jul 2012. arXiv:1207.6653v3 [hep-th], DOI: 10.1088/1475-7516/2014/01/015
- Accelerated Expansion from Negative Lambda. James B. Hartle (UC, Santa Barbara), S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (Leuven U. & Intl. Solvay Inst., Brussels). May 2012. 28 pp. arXiv:1205.3807v3 [hep-th]
- George's Cosmic Treasure Hunt. L. Hawking. S.W. Hawking. May 2011. ISBN-13: 978-1442421752
- The Dreams That Stuff is Made of: The Most Astounding Papers of Quantum Physics - and How They Shook the Scientific World. Stephen Hawking, (ed.) (Cambridge U., DAMTP). 2011. 1071 pp. Published in Philadelphia, USA: Running Pr. (2011) 1071 p. ISBN-13: 978-0762434343
- Local Observation in Eternal Inflation. James B. Hartle (UC, Santa Barbara), S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (APC, Paris & Intl. Solvay Inst., Brussels). Sep 2010. 4 pp. Published in Phys. Rev. Lett. 106 (2011) 141302. arXiv:1009.2525v2 [hep-th], DOI: 10.1103/PhysRevLett.106.141302
- The Grand Design. S.W. Hawking and L. Mlodinow (Sep 2010), ISBN-13: 978-0553805376
- The No-Boundary Measure in the Regime of Eternal Inflation. James Hartle (UC, Santa Barbara), S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (APC, Paris & Intl. Solvay Inst., Brussels). Jan 2010. 29 pp. Published in Phys. Rev. D82 (2010) 063510. arXiv:1001.0262v1 [hep-th], DOI: 10.1103/PhysRevD.82.063510
- George's Secret Key to the Universe. L. Hawking. S.W. Hawking. May 2009. ISBN-13: 978-1416985846
- Why Did the Universe Inflate? S.W. Hawking (Cambridge U., DAMTP). 2009. 7 pp. DOI: 10.1007/978-0-387-87499-9\_10
- The Classical Universes of the No-Boundary Quantum State. James B. Hartle (UC, Santa Barbara), S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (APC, Paris & Intl. Solvay Inst., Brussels). Mar 2008. 46 pp. arXiv:0803.1663 [hep-th], DOI: 10.1103/PhysRevD.77.123537
- No-Boundary Measure of the Universe. James B. Hartle (UC, Santa Barbara), S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (APC, Paris & Intl. Solvay Inst., Brussels). Nov 2007. 4 pp. Published in Phys. Rev. Lett. 100 (2008) 201301. arXiv:0711.4630 [hep-th], DOI: 10.1103/PhysRevLett.100.201301
- Volume Weighting in the No Boundary Proposal. S.W. Hawking. Oct 2007. 7 pp. arXiv:0710.2029 [hep-th]
- God Created the Integers. S.W. Hawking. Oct 2007. ISBN-13: 978-0762430048
- The Measure of the Universe. S.W. Hawking (Cambridge U., DAMTP). 2007. 6 pp. Published in AIP Conf. Proc. 957 (2007) 79-84, DOI: 10.1063/1.2823830
- Populating the Landscape: A Top Down Approach. S.W. Hawking (Cambridge U., DAMTP), Thomas Hertog (CERN). CERN-PH-TH-2006-022. Feb 2006. 22 pp. Published in Phys. Rev. D73 (2006) 123527. arXiv:hep-th/0602091, DOI: 10.1103/PhysRevD.73.123527
- Information Loss in Black Holes. S.W. Hawking (Cambridge U., DAMTP). DAMTP-2005-66. Jul 2005. 5 pp. Published in Phys. Rev. D72 (2005) 084013. arXiv:hep-th/0507171, DOI: 10.1103/PhysRevD.72.084013
- A Non Singular Universe. S. Hawking (Cambridge U., DAMTP). 2005. 2 pp. Published in Phys. Scripta T117 (2005) 49-50
- A Briefer History of Time. S. Hawking (Cambridge U., DAMTP), L. Mlodinow. 2005. 189 pp. Published in Reinbek, Germany: Rowohlt (2005) 189 p. ISBN-13: 978-0553385465
- Black Holes and the Information Paradox. S. Hawking (Cambridge U., DAMTP). Jul 2004. 7 pp. Prepared for Conference: Co4-07-18, p.56-62 Proceedings

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