

# Professor Yau Shing-tung

## Doctor of Science *honoris causa*

### Citation

Professor Yau Shing-tung is China's most prominent mathematician, and has made pioneering contributions to the fields of differential geometry and physics. He has won numerous awards including the Fields Medal, the United States National Medal of Science, the Wolf Prize in Mathematics, and the Shaw Prize in Mathematical Sciences. He is a member of many prestigious scientific academies, including the Accademia dei Lincei of Italy, the US National Academy of Sciences, the Chinese Academy of Sciences, the Indian Academy of Sciences, and the Russian Academy of Sciences. He was the Chairman of the Mathematics Department and a professor of the Physics Department at Harvard University, and is currently the Director of the Yau Mathematical Sciences Center at Tsinghua University. Professor Yau has dedicated his life to unravelling the mysteries of mathematics and physics.

Born in Shantou, in southern China, in 1949, Professor Yau moved to Hong Kong with his family to escape the civil war and grew up in a farming village in the New Territories. His father, a university teacher, had high expectations for his eight children, and instilled in them an appreciation for and understanding of literature and history from an early age. Frequent poetry recitations and calligraphy exercises inspired Professor Yau's lifelong interest in literature and history. His father would often invite students to his home to discuss Chinese and Greek philosophy, planting the seeds of Professor Yau's future interest in mathematics.

Professor Yau's interest in mathematics germinated at Pui Ching Middle School when he encountered Euclidean geometry, which revealed the beauty and ingenuity of mathematics to him. In 1966, he entered Chung Chi College at The Chinese University of Hong Kong, majoring in mathematics. His talent so impressed Dr Stephen Salaff from Berkeley that he was admitted to the Graduate School at UC Berkeley in 1969. He achieved his first significant breakthrough in mathematics there, by extending Preissman's theorem on negatively curved manifolds to non-positive ones. Professor S. S. Chern suggested he write this work up as his PhD thesis in 1971. He then started his career at the Institute for Advanced Study at Princeton University.

In 1954, Eugene Calabi had proposed finding Kähler manifolds within a Chern class. Recognising the implications for general relativity, Professor Yau worked on solving the fully nonlinear partial differential equations associated with Calabi's conjecture, and proved the conjecture in 1976. He followed up by solving the positive mass conjecture in general relativity using minimal surfaces with his student Richard Schoen. For these accomplishments, in 1982, he was awarded the Fields Medal, the highest honour in mathematics, which can only be given to mathematicians under the age of 40.

String theory was developed in the 1980s to try to unite quantum mechanics and general relativity, and the Kähler manifolds found in the resolution of Calabi's conjecture became the "universe" sought by physicists, now also known as "Calabi-Yau space". These have since become central to string theory, illustrating how mathematical beauty can find applications in physics.

Professor Yau's academic career has been illustrious. Holding permanent positions at Princeton University, Stony Brook University, Stanford University, UC San Diego, and settling at Harvard University in 1987, Professor Yau joined Tsinghua University in 2022. Inspired by his father's words about contributing to one's people, Professor Yau has devoted himself significantly to the mathematics community in China, where he has founded research institutes in Hong Kong, Hangzhou, Beijing, Taipei, Nanjing, and Shanghai that have produced many famous mathematicians.

Throughout his career, Professor Yau has received accolades and honours in recognition of his groundbreaking scientific research, and holds honorary doctorates from Columbia University, University of Waterloo, University of Alberta, National Taiwan University, The Hong Kong University of Science and Technology, The Chinese University of Hong Kong, and many others.

Mr Chairman, it is my honour to introduce you, on behalf of Lingnan University, to Professor Yau Shing-tung, the world-renowned mathematician, for the conferment of the degree of Doctor of Science *honoris causa*.

*Citation written and delivered by Professor Raymond Chan Hon-fu*

# 丘成桐教授

榮譽理學博士

## 贊辭

丘成桐教授是中國最著名的數學家，在微分幾何和物理學領域均作出開創性貢獻。丘教授屢獲殊榮，當中包括菲爾茲獎、美國國家科學獎章、沃爾夫數學獎、邵逸夫數學科學獎等。他現為多間顯赫的科學院院士，這些科學院包括意大利林琴科學院、美國國家科學院、中國科學院、印度科學院和俄羅斯科學院。他曾任哈佛大學數學系主任及物理學系教授，現任清華大學丘成桐數學科學中心主任。丘教授一生致力於解開數學和物理學的奧秘。

丘教授在1949年出生於中國南方的汕頭，年幼時為逃避內戰隨家人移居香港，在新界農村長大。他的父親是大學教授，對其八名孩子寄以厚望，從小教導他們文學與歷史知識，為他們打下紮實的文史基礎。那時丘教授時常背誦詩歌、練習書法，培養出畢生對文學和歷史的興趣。其父經常讓學生到家中討論中國和希臘哲學，也激發了丘教授日後對數學的濃厚興趣。

丘教授就讀香港培正中學時初次接觸到「歐幾里得幾何」，領悟到數學的奧妙。1966年，他升讀香港中文大學崇基學院，主修數學，其天賦得到來自柏克萊的史蒂芬·薩拉夫博士（Stephen Salaff）青睞，於1969年獲加州大學柏克萊分校研究院取錄。丘教授在那裡完成其首個重大的數學研究突破，將Preissman定理的負曲流形定理擴展到非正曲流形，著名數學大師陳省身教授建議他於1971年以此為其博士畢業論文。其後，丘教授於普林斯頓高等研究院開展他的研究事業。

1954年，數學家歐金·卡拉比（Eugene Calabi）在陳省身教授的課堂上提出尋找凱勒流形。在認識廣義相對論的影響後，丘教授開始求解與卡拉比推測相關的完全非線性偏微分方程，並於1976年證明了該猜想成立。隨後，他與學生孫理察（Richard Schoen）合作以極小曲面破解了廣義相對論中的正質量猜測。這些成就使丘教授於1982年獲頒數學界的最高榮譽——菲爾茲獎，一個只頒發予40歲以下的數學家的獎項。

1980年代，弦理論的發展旨在統一量子力學和廣義相對論，而在證明卡拉比推測的過程中發現的凱勒流形則成為物理學家所探究的「宇宙」，現亦被稱為「卡拉比-丘空間」。自此這都已成為弦理論的中心，展現數學之美如何應用在物理學中。

丘教授擁有輝煌的學術生涯，曾於普林斯頓大學、石溪大學、史丹福大學、加州大學聖地牙哥分校擁有終身教席，於1987年加入哈佛大學，其後於2022年加入清華大學。受父訓影響，丘教授一直致力於推動中國數學界發展，在香港、杭州、北京、台北、南京、上海等地創辦多所研究機構，培育出眾多知名數學家，為人民作出貢獻。

在其研究生涯中，丘教授憑著突破性的科研成果屢獲獎項及殊榮，並獲哥倫比亞大學、滑鐵盧大學、阿爾伯塔大學、台灣大學、香港科技大學、香港中文大學等多所院校頒授榮譽博士。

主席先生，本人深感榮幸能代表嶺南大學向閣下介紹世界知名數學家丘成桐教授，並謹恭請閣下頒授榮譽理學博士學位予丘教授。

贊辭由陳漢夫教授撰寫及宣讀