Professor David MUMFORD
Citation

Professor David MUMFORD is a world-renowned mathematician and computer scientist, celebrated for his groundbreaking contributions that have fundamentally transformed algebraic geometry. An awardee of the Fields Medal that is widely regarded as the highest honor for mathematicians, his pioneering works, including the development of the Mumford-Shah functional, have made a lasting impact across diverse academic fields such as string theory and computer vision.

Born in England, Prof. Mumford moved to the United States with his family at the age of three. There he showed early promise while still in high school, winning a prize in the Westinghouse Science Talent Search for a relay-based computer he built. Despite the temperamental nature of the computer, which led to short-circuits and even a small fire, the achievement gave the young Mumford the self-confidence to pursue greatness.

While studying at Harvard University, Prof. Mumford was captivated by pure mathematics, where he was inspired by the lectures of acclaimed mathematicians George MACKEY, Oscar ZARISKI and Alexander GROTHENDIECK. After gaining his PhD in 1961, he joined the faculty, where his work in algebraic geometry and the study of algebraic curves earned him the prominent Fields Medal in 1974.

In the early 1980s, Prof. Mumford shifted his focus to the understanding of human and machine vision, swiftly becoming a leading figure in computer vision and pattern recognition. His development of the Mumford-Shah functional has profoundly impacted many areas of applied mathematics, as well as edge detection and image segmentation in computer vision.

Prof. Mumford joined Brown University in 1996, attracted by its interdisciplinary culture. There, he continued his influential work in applied mathematics, particularly in pattern theory. His work in this area has become a cornerstone of modern computer vision and cognitive science, revolutionizing our understanding and processing of visual and other types of data.

A Professor Emeritus at both Brown University and Harvard University, Prof. Mumford has mentored numerous PhD students in algebraic geometry along with his scholarly accomplishments. His zeal for science and wisdom has propelled many of his students into brilliant careers across diverse areas, including Prof. ZHU Songchun, director of the Beijing Institute for General Artificial Intelligence, and Prof. WANG Yang, Vice-President for Institutional Advancement at the Hong Kong University of Science and Technology (HKUST).

Prof. Mumford is a prolific author dedicated to making mathematics accessible to a mass audience. His famous *Red Book* is a staple for graduate students studying algebraic geometry and won him the AMS Steele Prize for his expositional brilliance. His other works, such as *Geometric Invariant Theory* and *Algebraic Geometry*, enthral mathematicians worldwide. In contrast, *Indra's Pearls: The Vision of Felix Klein*, guides nonmathematicians to the fascinating world of geometries—underscoring his belief that mathematics permeates our everyday life.

The articles penned by Prof. Mumford are highly esteemed in academia, frequently appearing in prestigious publications, such as *Nature Neuroscience*, *International Journal of Computer Vision*, and *Proceedings of the National Academy of Sciences USA*. He has even co-authored a paper on Chinese history titled *"Yu laid out the lands": georeferencing the Chinese Yujitu*, testifying to his wide-ranging expertise.

His influence has been recognized by numerous accolades. In addition to the Fields Medal, Prof. Mumford was awarded a MacArthur Fellowship in 1987 and the Shaw Prize in 2006. In 2010, the then US President OBAMA presented the National Medal of Science, the USA's highest distinction for contributions to scientific research, to Prof. Mumford in recognition of his interdisciplinary approach and fundamental contributions to mathematics, computer vision and neurobiology.

Even in retirement since 2007, Prof. Mumford continues to explore his longstanding interests including mathematics education, the history of mathematics, AI, quantum physics, and contemporary global issues. He is currently writing a book, tentatively titled *Modelling the World with Mathematics*, aimed at demystifying mathematics for people who have a lifelong aversion to the field.

Back home, Prof. Mumford is devoted to passing on the torch to his 13-year-old grandson, Kaspar, who shows promise in mathematics and is studying Mandarin at a Chinese American school in Manhattan. Believing in the universality of knowledge, Prof. Mumford is keen to bridge the centuries-old wisdom between the East and the West. He holds high hopes for HKUST, which he likens to Hong Kong's Massachusetts Institute of Technology, with its strengths and accomplishments in a plethora of scientific and technological areas, including artificial intelligence.

Pro-Chancellor, on behalf of the Council of the Hong Kong University of Science and Technology, I have the high honor of presenting to you, Prof. David Mumford, a Fields Medalist, for the award of Doctor of Science *honoris causa*.