

Conferral of the Degree of Doctor of Science, *honoris causa*  
A Citation



**Yang Chen Ning, BSc, PhD, DSc, Nobel Laureate in Physics**

No award in the modern world is more esteemed than the Nobel Prize. The man we honour today won that prize some time ago: he was only thirty-five. His colleagues know him as a man whose friendly humanity is as evident as his unshakeable duty toward the progress of science and society in China. Especially in his caring for the young and his insatiable intellectual curiosity we glimpse the essence of his life. This curiosity extends beyond science into aesthetics and the humanities. Robert Browning asked in these famous lines:

*Ah, did you once see Shelley plain,  
And did he stop and speak to you  
And did he speak to you again?*

At The Chinese University of Hong Kong, we have seen Yang Chen Ning plain. He has stopped and spoken to many of us in ways that we shall not easily forget. His name must be included among the most illustrious physicists in the entire history of physics: Newton, Faraday, Maxwell, Einstein, Dirac — and certainly Yang. I believe he is also that most elusive of beings, a great man. That we honour him today is as real a privilege as it is a fortunate duty.

Professor Yang's thinking displays what the novelist Tolstoy called the highest wisdom, "...the science of the whole — the science explaining the whole creation and man's place in it." Yang's theoretical physics has played a major part in explaining the very foundations of the behaviour of all matter in a way that resonates with Einstein's theme of a unified theory. Through his good will towards others and utter lack of pretention, he provides not precepts but a living example of what Tolstoy envisioned, working tirelessly to inspire young people in the world of education and helping the peaceful progress of humanity by linking countries through science and education. He has inspired and helped the Zhongshan University Advanced Research Centre and another at Tsinghua in Beijing. Most recently he has been selected to head a committee of the SAR to advise on developing new technology.

How did Yang Chen Ning manage to become one of the greatest physicists in our century of great physicists? There is no brief answer, except to stress his own genius and say that his route to fame is as surprising as modern physics itself. Born in Anhui, China, the student Yang revealed something of his potential at the National Southwestern Associated University in Kunming by obtaining his Bachelor of Science degree earlier than most, at the age of twenty. His father was a Professor in Mathematics, so that home background was a decided advantage. Professor Yang, the second generation of modern scientists in China, recalls his undergraduate university as first-rate, despite a class he took with a rather bad English professor! Looking back on his senior year in a small department, he recalls the advent of Huang Kun, a new graduate student with whom he forged a friendship that was to last fifty years, and their discussions of the then revolutionary quantum mechanics with Professor Wu Ta-You. The following year, as a graduate student himself, Yang shared a small room and a job in a middle school with his fellow students, Huang Kun and Zhang Shou-Lien. The background to their lives was war and the retreat of masses of civilians and troops to the



hinterland. This sounds an even more unpromising route to the Nobel Prize than Einstein's Patents Office in neutral Switzerland. Yet this triumvirate of young scientists would drink tea after supper and talk for hours about everything that caught their attention, but above all about physics, their discussions and arguments lasting well beyond "lights out" in their small room at the middle school. Once, they settled an argument by means of a candle-lit reading of key paragraphs from Heisenberg's *The Physical Principle of the Quantum Theory*. While they were arguing about a science that would change human warfare and history forever, soldiers were marching past with prisoners soon to be shot. China was being torn apart by Japanese invaders and civil strife. Yang, however, was groomed by the best Chinese scientists, thrown together by the exigencies of war, and with the aid of the Tsing Hua Foundation, he obtained within another six years his PhD from the University of Chicago. His taste and style in physics, though, had already been shaped with his friends back in the tea houses in Kunming. So, too, had his command of English, aided by reading and discussion of authors such as Conrad, Kipling and Galsworthy.

A year after the PhD he moved in 1949 to the Institute for Advanced Studies at Princeton, where he became a professor in 1955. In 1957 he won the Nobel Prize for Physics with his co-researcher, Professor T.D. Lee. Predictably, academic honours rapidly came his way: Princeton's Honorary Doctorate was followed by a swarm of others from as far away as England, Poland, Russia and Taiwan.

Yang and Lee's Nobel Prize discovery in 1956 was parity non-conservation for the weak interactions, the notion that left-handed and right-handed particles do not behave perfectly symmetrically as mirror images of each other. This insight demolished an unwarranted assumption held by previous physicists. Earlier, in 1954, with Robert Mills, Yang Chen Ning had also formulated the theory of non-Abelian gauge fields, an enquiry later recognised to be of even more fundamental importance than the Nobel Prize work, for it has led to a unified theory by which to understand the nature of matter itself, the forces that act upon it, and the "fearful symmetries" to use the poet William Blake's phrase, that operate to hold the formalism together. This general field-theory synthesizes at least three and possibly four of what were once thought of as four basic forces of nature. It provides a theoretical framework within which it was later shown that the seemingly separate forces are differing aspects of one force. This "conceptual masterpiece" as it has been called, explains many features of the interaction of subatomic particles, and has redirected developments in physics especially in the last twenty-five years, as well as building bridges from theoretical physics to advanced mathematics, achievements admired by such brilliant mathematicians as Professors S.S. Chern, S.T. Yau and Sir Michael Atiyah, all of them Honorary Graduates of our University.

Those who can follow Yang's work in physics through his many publications and papers testify to its precise elegance, distinguished by a feeling for beauty and symmetry. To quote from his Nobel lecture, "The Law of Parity Conservation and Other Symmetry Laws of Physics" is to hear Yang's feeling for the beauty of mathematical reasoning coming through: "When one pauses to consider the elegance and the beautiful perfection," he says, "of the mathematical reasoning involved and contrast it with the complex and far reaching physical consequences, a deep sense of respect for the power of the symmetry laws never fails to develop." Professor Yang's interest in Chinese and Western art suggests that he possesses an aesthetic sensibility also at work in the deepest levels of his scientific thinking. This is what the poet Wordsworth called "the finer spirit" of humanity.



Since his Nobel Prize, Professor Yang's work has richly merited an array of honours and awards: the Rumford Premium (1980), the U.S. National Medal of Science (1986), the Benjamin Franklin Medal (1993), the Bower Award (1994) and the N. Bogoliubov Prize (1996). His services to physics have led him to a host of distinguished lectureships at many prestigious universities world-wide from Zurich to Stockholm, from Harvard to Fudan. His service to the international community includes not only contributions to the Academy of Sciences in his native China and to that of his second country, the United States of America, but to the Royal Society in Britain, the Academia Sinica in Taiwan, and other academies in Latin America and Europe, including the Pontifical Academy of Science — at the request of the Pope in 1997.

His generosity as an academic may be traced throughout his career but most vividly for us through his long relationship with this University and Hong Kong. In 1964 he made a sensation with his lecture to overflow audiences in the then newly opened City Hall. In 1983 Yang Chen Ning was made an Honorary Professor at the Chinese University and then in 1986 graciously accepted a special Chair as Distinguished Professor-at-Large. This he holds concurrently with his post as Albert Einstein Professor of Physics at the State University of New York, Stony Brook. He spends a substantial part of each year with us, for he loves this beautiful campus, linked to some of his best memories. The benefits of his influence here are incalculable. One example must suffice: he contributes to our journal, *Twenty First Century*, has become one of the most conscientious members of its editorial board, and has attracted top contributors, thus helping to maintain and ensure its truly international status.

Professor Yang Chen Ning has helped the rest of the scientific community to understand more about the force at work on sub-atomic particles of matter than any previous thinker in the history of science. He has shown us the universe in something far smaller than the finest dust. And his plain humanity has revealed a spirit richer than all the prizes he has won. His adventures are those of a great intellect, gleaming in the deeps of the mind. Madam Chancellor, I present Nobel Laureate Yang Chen Ning for the degree of Doctor of Science, *honoris causa*.